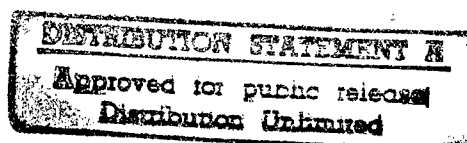




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Soviet Union

AVIATION & COSMONAUTICS

No 8, August 1989

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Soviet Union

AVIATION AND COSMONAUTICS

No 8, August 1989

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AVIATION AND COSMONAUTICS

No 8, August 1989

AF CIC Condemns Stalinism, Praises Perestroyka

90R10001A Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 8, Aug 89 (signed to press
05 Jul 89) pp 1-3

[Article by twice Hero of the Soviet Union Mar Avn A. Yefimov, commander in chief of the Air Force, USSR deputy minister of defense, USSR people's deputy: "History: Moral Lessons"]

[Text] USSR Air Force Day is a national holiday. Soviet aviation is our common pride and joy, the embodiment of scientific and technological achievements, cradle of the space program. Aviation evokes thoughts of romance and daring, courage and loyalty. Intrepid aviators possess the popular image of knights of the Fifth Ocean, men of valor and nobility. This is unshakable and eternal. But do we always assimilate and assimilate well those spiritual values achieved by our fighting predecessors in flying and in combat? Or, having called the past a time of glorious traditions, do we recall it only on holiday occasions?

Our daily routine has changed: things move faster, have become more complex, and have taken on an exceptional diversity. The fact is that realities have always been this way. Perhaps fearing the genuine complexity of life, or perhaps failing to recognize this complexity, for many years we proceeded along the surface of life's phenomena, without taking the trouble to do the difficult, tiring job of gaining knowledge of our daily work and of ourselves. We were running away from daily routine, rejecting it, feeling burdened by it. We focused either on the unknown future or on the heroic past.

We do not like at all the following question: what is taking place here and now? But the strength of reality lies in the fact that it is reality. And the time is unavoidably arriving when we must give answers to those questions which we so assiduously avoided over the course of decades.

Today as well, in order to obtain reliable points of reference, we must first and foremost understand the interrelationship between history and the present day, between the past and present, between the eternal and the transient. What elements from the experiences of our fellow countrymen will take their place in the contemporary spiritual and intellectual process? What elements are doomed to oblivion, in spite of the fact that they are close and precious to many of us?

History is just now opening up to us, casting down the weight of interpretations, notions and appraisals which have been forced upon it. It is opening up, laying itself bare. Much proves to be unexpected, not that to which we had become firmly accustomed.

Our seven decades have brought not only victories, not only heroism, and not only flights of lofty fullness of spirit. Our past has also contained a dramatic struggle, a chain of tragic mistakes, and confusion of the human spirit. And all this must be courageously divided into white and black, no matter how painful the operation of such differentiation of the past. Or do the 1930's through the 1950's contain nothing but Stalinism, nothing but delusions, nothing but suffering, and do the 1960's and 1970's contain nothing but stagnation and lack of air to breathe?

These are difficult questions.... But we must address them today.

It is said that life is that effort which man exerts each day. Let us take precisely effort as an ally in order to arm ourselves with a genuine view of history.

Yes, the struggle for power was concealed from the people. Primitive schemes of the evolution of multifaceted reality were foisted on the people. There was a soul-searing fear of unchecked violence. There was a hypocritical unanimity of view in the face of a terrible lack of unity among people, with prohibition of any thought not prescribed by the official register. There was the difficult, the humiliating, the terrible. But was this all there was? This was not all that was taking place, for example, in the Air Force....

The Red Air Force was born together with the revolution. This was not a simple process: the combat air arm of the young Soviet Republic came from within the counterrevolutionary military, which was old in origin and function. But military aviators did not proceed to different sides of the barricades in a mechanical fashion, according to a class basis. Perhaps one of the most dramatic delusions—a delusion with tragic consequences—was the fact that we unequivocally linked the struggle for socialism with a single bearer—the worker class. And yet socialism is the spiritual achievement of all mankind, of everything progressive in the world. And this idea belongs to all those who refuse to accept slavery and inequality. The idea of socialism as a line of personal conduct is chosen by each specific individual, by that person alone and for that person alone. Class affiliation only increases the probability of choosing a given social concept. At this moment the citizen is guided by considerably deeper levels of being and layers of consciousness than signs of class kinship.

This subtle moral-psychological nuance must be seen in the countenance of aviation during the civil war years in order for one not to be deceived today. Nor is devotion to perestroyka defined by some one simple criterion. One's attitude toward revolutionary renewal is a complex inner process of the individual's selection of type of civic activeness. One cannot impose from without a correct strategy of life onto another person. Political conservatism is by no means the mandatory attribute of a high position, just as the fact of a modest position is not a guarantee of revolutionary and innovative spirit.

Unfortunately reality is more complex, more diversified, and more conflictive. Today in the Air Force, just as in any community, division into supporters and opponents of perestroika is taking place not on the basis of one's job or position but rather within the "space" of men's souls.

This is why the process of struggle for qualitative improvement in combat readiness takes place with such difficulty. Here is the area of new, hard, and not yet fully mastered work on the part of commanders, political workers, party and public organizations. Not for the sake of putting individuals into the classification of innovator and conservative, but rather in order to unify personnel with the idea of defense of the homeland. Because even the loftiest ideas, as life demonstrates, cannot be eternal spiritual driving forces. Everything connected with man is a dynamic process. And it is for this reason that declines, disappointments, and devastated morale are inevitable. Wherever one's feeling of involvement in the transforming efforts of one's community weakens, doubts about the correctness of one's choice are inevitable, and from here it is not very far to disintegration of devotion to any idea.

The history of the Civil War and the biographies of aviators of that time convince us that principal decisions do not come to one automatically, and devotion to adopted principles is not mechanically reproduced. This is an extremely important testament of the past, to the present and future. The end of the 1920's and beginning of the 1930's was a period of establishment of Soviet military aviation on the foundation of our own aircraft engineering and aircraft industry and our own military doctrine. What from the hard experience of those years is worthy not only of remembering but also of preserving among the ranks of contemporary operative truths?

In objective terms we lacked a great deal in order to establish an air force matching the world standard. But it had to be done, in spite of what seemed to be insurmountable obstacles.

What helped refute all the impossibilities? Of course a great deal helped: the absolute centralization of resources, rigid responsibility on the part of each individual, and hard work by the entire country. But the main thing was that we were counting on ability. Experimental design bureaus were entrusted to young engineers; recent student pilots were assigned to high command positions; anybody who possessed creative potential in tactics had the opportunity to conduct research and investigation in the area of combat employment of air forces. And as paradoxical as it might seem, the already firmly-established administrative-bureaucratic system (perhaps its unique competence lies precisely in this?) made every effort to assist everything being brought forward by scientific and technological advance.

This lesson of the past should also evidently not be forgotten. Counting on talent is always contemporary,

particularly today, in the course of perestroika. How does talent differ from conscientious mediocrity? In its tendency toward the unusual in formulating questions and in an ability to come up with nontrivial solutions. Talent does not simply give incremental growth to an undertaking. Talent radically transforms the entire undertaking. It establishes the essence of phenomena. It finds linkages which are unseen by others. It discovers elements in the functioning of complex systems which make controllable those factors which are traditionally considered immune to man's will. Revolutionary renewal presupposes doing away with stereotype situations. This task cannot be accomplished without talents. The most reliable thinking, which has mastered a repeating group of problems, is impotent when a breakthrough is required and when it is necessary to overcome routinism. But predictable pattern and routinism are amazingly persistent.

Today the Air Force urgently needs gifted commanders and commissars, talented pilots and technicians. Without seeking out gifted, bold individuals and without relying on their creative potential, one can only dream about revolutionary renewal. Or should one secretly hope that this restless, "troubled" time will some day pass?

In the 1930's everything was done in order to create the atmosphere in our country which was essential to Stalinism. The sincere enthusiasm of faith in a happy future that was soon to be was also the object of manipulation. For example, it goes as follows.... A leader is great when he is head of a powerful state. Might does not need tangible confirmations. And a machine to produce record performances is put into play, in all domains, in the kolkhoz fields, in factory shops, in mines, and on athletic fields, on the sea and in the sky. Particularly in the sky: in the 1930's countries were appraised on the basis of development of aviation. A string of world distance, speed, and altitude records impresses the rest of the world. And what better than records symbolizes the grandeur of the state and the genius of the individual who leads the people from victory to victory.

But what was the basis of those unusual records? Did they reflect the overall state of Soviet aviation, the overall technological level of development of industry, technology, and sophistication of engineering design? No, they did not. The records of that time were not so much an indication of progress as a result of overexertion of a nation, human courage, valor, and willingness to take a risk for the glory of the homeland.

Thus a conflictive element is interwoven in a single fact from the past: artificially created great illusions and the genuine selfless devotion of aviators to their homeland. We must be clearly aware of this tragic contradiction and subject it to moral and ethical reanalysis. Otherwise the pure light of human fullness of spirit of the older

generations and the sharp reflections of the cold glistering of false ideals imposed upon our people will mix together and become indistinguishable from one another.

As we list the names of famous aviators of that turbulent era: V. Chkalov, M. Gromov, V. Kokinaki, S. Suprun, P. Stefanovskiy, A. Yakovlev, S. Ilyushin, A. Tupolev, and many others—we must remember that shortly before the war practically all top Air Force officials became the victims of Stalinism, one after the other. Recent heroes were instantly transformed into “enemies of the people”—this was a simple but reliable mechanism for poisoning people’s consciousness, ensuring a state of society suiting the dictator’s needs: a willingness to carry out any order without a murmur. Heroism and fear, love of freedom and servitude within a single soul are paradoxes of history.

A great deal has been written and spoken about the Air Force during the years of the Great Patriotic War. Nevertheless it is very important carefully to examine one circumstance, which is moral and ethical in nature and significant in consequences....

Of course Soviet citizens were not so blind that they were unable to see the orgy of unjustified repressions, and they were not so naive as not to understand what was going on in this country. The people cannot be deceived: they knew, they understood, they hated, they hoped, and they waited. But what was the source of that mass heroism, which became the standard of conduct in the flame of battle and on the labor front in the rear? The Soviet citizen was fighting for liberation from the fascist invasion and for a happy, improved lot in life, believing that Stalinism was not eternal. For this reason all the finest elements which had been preserved in the hearts of the citizens of the first socialist country redoubled again and again, as it were. Hatred toward the foreign enemy was united with an insatiable desire for freedom, which engendered the will and strength for a savage struggle.

The moral lesson of the Great Patriotic War also lies in the fact that during that time of ordeal the Soviet citizen resolved the most acute conflicts and contradictions, turning to the eternal and rejecting the accidental, even if an incomprehensible price had been paid for that fatal absurdity.

Wherein is the lesson of the 1940’s of particular value to today’s contemporary, who is defining his attitude toward perestroika? Probably first and foremost in the fact that history is once again testing each of us: to what are we loyal—to the cause which we are serving, or to that selfish element which, contrary to our wishes, lives in us? In my opinion the principal moral standard of the present era is participation and involvement in specific work. But how frequently progressiveness on the part of the individual is identified with confrontation toward everything and everyone. The heat of criticism continues to predominate over persisting, calm search for realistic

ways out of the impasses with which daily life is replete in any field of endeavor. We too suffer from excessive enthusiasm for reformism.

Without criticism there is no development, no progress, and no life. It is fruitless, and sometimes harmful as well, however, when it is constructed exclusively on negation or plotting and recording of shortcomings. Criticism is essentially a method of gaining knowledge of reality, and it is one of the highly active methods. The range of its cognitive action is unusually broad, and the forms of method implementation are quite diversified. The process includes adding to previous knowledge, refining and detailing certain aspects of what was known previously, and delving deep into important elements of the object of investigation. It also includes bringing agreement between the dissimilar, and overcoming the conflictive and contradictory. From well-reasoned confirmation to convincing refutation—these are different levels of critical method of cognition and transformation of actual processes. The area of full development of critical thinking is enormous. But how frequently it is projected onto a single line joining two extreme points: the way things are is bad—things must be made good. This exhausts the entire powerful charge and revolutionary potential of the critical method. Such an approach adds virtually nothing to the matter at hand.

Of course genuine investigation of the history of Soviet combat aviation in the interests of moral and ethical assimilation of the legacy of the aviators of the older generations still lies ahead. There will be an enormous amount of work to be done to strip primitive ideological contrived effect from facts and events. It is the professional task and patriotic duty of historians to separate the wheat of bitter truth from the tares of beautiful myths. But every individual involved in the affairs of the present is entitled to take lessons from the past which can be grasped by his cognitive instinct and striving for the truth. I too am doing this. I am doing it without claim to be the final arbiter of the truth, but rather with the conscientiousness of a participant in and witness to that which took place, which laid the groundwork for the radical changes in our lives, the time for which has arrived.

One is taught not only by the past. The present also teaches difficult and important lessons, and the first of these lessons is acknowledgment of the right of unusualness and complexity in our daily practical activities. Theoretically we have always assumed the presence of such a quality in that which is taking place with us and around us. But as soon as things reached the point of participation in specific processes, we would simplify everything. We would fit and adjust reality to the moribund functions of consciousness shackled in the grasp of dogma. Wherever considerable research and organizational work was required, one would make do with appeals and slogans. Wherever there was a shortage of resources, one would limit oneself to “heightening demandingness.” Wherever astute, comprehensive study of an individual was needed, one would be satisfied with

mere enumeration of absent shortcomings, showing little concern with the presence of a strong set of virtues—both professional, spiritual and intellectual.

Today the crudely primitive approach is disappearing. Today the complexity of life makes one pay for failure to be prepared. Failure, misfortune, and lack of success occur wherever one does not rise to the art of management of affairs and men.

For example, we have become accustomed to assuming, without the slightest nagging doubt, that the ethics and morality of the professional military man know no vacillation, as if it is acquired all at once and continues throughout one's entire service career. Nothing but brilliant heights of spirit, nothing but boundless devotion to fine traditions, and nothing but inexhaustible dedication to the cause were assumed in every officer. Lively, flowing fullness of spirit would be replaced by a metaphysics which was convenient by virtue of its fixed nature. But close scrutiny indicated that ethics and morality were not a permanently-fixed quality but rather a process of restlessness of the human soul. In real life it would seem that there is nothing other than processes. A dead zone, a moral and ethical desert becomes established wherever movement disappears. To fail to understand this means to doom oneself to collision with the unpredictable nature of the actions of our own comrades and to drive oneself into a domain of moral-ethical agnosticism.

The time is long past when exclusively favorable variations of development were established behind ethical standards. Every vital human factor was acknowledged to be one-dimensional. If the quality in question is patriotism, there is only flawless patriotism. If it is internationalism, then it is higher than all other things and resides in every individual. If the question is collectivism, then everything personal and individual has no basis for existence. Of course it was often necessary to shut one's eyes to certain "unlawful" deviations, such as, for example, when exemplary patriotism did nothing to impede professional incompetence, or when an officer's honor did not keep him from failure properly to observe preflight procedures. The very fact of being an officer automatically meant that one possessed honor, virtue, patriotism, and unselfishness. Everything which contradicts or is in conflict with the set of standard excellent qualities is ignored. How simple and easy!

Adherence to reduced schemes of reality was often our serious undoing, but we persisted in ignoring this fact. At first we also had an oversimplified attitude toward perestroika. Why complicate things unnecessarily? After all, everybody is for it. But now four years have passed since that memorable April 1985. Have we succeeded in substantially increasing our level of operational readiness, in raising our level of professional skill, in ensuring absolute flight safety? Have we succeeded in elaborating a political work style and political work forms adequate to the national defense mission? On USSR Air Force Day it is entirely logical and legitimate to turn to Soviet

combat aviation's past in order to pay homage to its fame, achieved in past battles and unceasing labor. But is it not a more worthy endeavor to take lessons of stern and courageous morality and high ethics which were confirmed by our fathers in the name of and for their sons? Because perestroika is a moral, ethical era, an era of spirit.

And if life means effort being performed, today's military airmen have no reason to doubt the extraordinarily substantial content of each and every day dedicated to serving the homeland.

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Mig-29 Fulcrum Scores Gun "Kill" in Mock Dogfight

90R10001B Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 8, Aug 89 (signed to press 5 Jul 89) p 4

[Article, published under the heading "For a High Degree of Combat Readiness," by Military Pilot 1st Class Maj V. Parkhomenko: "Unassisted Threat Search"]

[Text] The rainy weather had been left behind, somewhere down there below, under the thick white fleece of clouds. Visibility at ground level was very poor. But up here at altitude the air was transparently clear. The sun had an uninterrestrial brightness. Although it was blindingly bright, my mission was to seek out and locate a threat aircraft!

Of course an "enemy" aircraft is not a needle in a haystack. The targeting radar could have helped, but almost immediately after takeoff I was given a scenario instruction that it had "failed."

I was using the fixed sight reticle, very similar to that which our air aces used with success during the Great Patriotic War. My own eyes and the gunsight were my sole resources. Even ground control was silent, for I was conducting threat search without ground radar assist.

The "enemy" was also seeking engagement. My threat receiver was plaintively chirping. The "adversary" was already looking at us on his targeting radar scope. Based on the intensity of my threat receiver's chirping and the blinking of the receiver's multicolored lights, I concluded that he would be launching missiles in 15 to 20 seconds. This meant that the radar lock must be broken at all costs, for if I waited any longer things would be tough. I swung right and rolled toward a position up-sun. The sun would protect me both against heat-seeking missiles and visual detection. At the very least it would make things more difficult for him.

My threat receiver fell silent. One thing had been accomplished: the radar lock was broken. Now the "adversary" and I were on equal terms. All I had was my eyes. All I knew was that my adversary was above me and somewhere to the right. This I had learned from the threat

receiver display. I did not exactly know but rather sensed intuitively that I should pay particular attention to the starboard hemisphere, although I continued the standard figure 8 airspace scan. With all the head turning, it would be nice to have a silk scarf.... But somebody got the notion that today's pilot does not need to turn his head—his instruments tell him everything. And the white scarf has disappeared. What a pity!

Suddenly I spotted a sun glint high above me to the right and behind. I immediately recalled the line in the manual: "When you are in the air, consider everybody your enemy until you determine otherwise." My speed was already adequate, but nevertheless I lit the afterburners and broke hard in the direction of the sun flash. I was pulling close to maximum G's. It was becoming obvious that what I had seen was the sun glinting off my adversary's canopy.

We headed swiftly toward one another. He had an altitude advantage. I had to neutralize that advantage. I had to get on his tail at all costs. We passed each other at close quarters. If it had not been for the extreme speed, I probably would have been able to make out the pilot's face. I tried not to think about who might be flying as my "adversary." No matter who it might be, he was endeavoring to accomplish the same thing I was: to get on the other's tail and fire off a missile and, if possible, also "squeeze off" a few bursts of cannon fire.

We broke in different directions. I went inverted and, maintaining high G forces, executed an intricate maneuver. My "adversary" was once again heading right for me. I kept the afterburners lit: the extra speed capability never hurts. I adjusted slightly away from a collision course, for it would not be a good idea to ram the adversary in a mock combat engagement.

We again broke back to back. I firewalled it. The acceleration threw my head back. There was now no point in trying to use the dogfight mirrors. At high G's they vibrate so much you can't see anything. Keeping my gaze fixed on my adversary, who was turning hard in an attempt to get onto my tail, I pulled the stick back. I don't know how, but I was able to notice that the angle-of-attack reading was close to the redline. Later the flight data recorder tapes indicated that I had been only 0.2 degrees short of being past the never-exceed angle of attack. I was truly walking on thin ice!

I broke hard at maximum G's for the second time during this engagement. This is what decided the outcome of the battle. Range to target was good. I adjusted aim to allow for maneuver and bullet normal gravity drop, for the fixed reticle is not a predictor system. Before squeezing the firing button, I glanced rearward by force of habit, to see if anybody was on my tail.

The gun camera rolled. The film would certify my kill. I broke violently away, once again on afterburner, into the sun.

I thought again about my "adversary." He would be pleased with my performance, for he also can take credit for the fact that I was able to win this difficult fight. No, the point is not that my adversary yielded his principles. On the contrary, as always he was a fierce "opponent" in battle. It is simply that prior to this engagement, on the ground and during previous performance-graded training flights, he was my instructor. Yes, he will be pleased, for every teacher likes to see himself in his pupils.

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AF Veterans Hold Youth Patriotic Indoctrination Training Conference

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[Article, published under the heading "Problems of Training and Indoctrination": "Strengthening the Bond Between Generations (Report on Training Classes With Air Force Veterans on Military-Patriotic Indoctrination of Youth)"]

[Text] Hero of the Soviet Union Col A. Rutskey once stated during an interview that unfortunately one notes some weakening of the bond between generations, the linkage of time. Nor is this combat pilot alone in his view. This thought also concerns Air Force veterans and those who are currently on active duty. I do not believe that this is simply the age-old problem of fathers and sons. It goes much deeper: the point in question is the today and tomorrow of the Armed Forces as well as the fate of perestroyka.

One cannot say that this issue, and particularly problems pertaining to military-patriotic indoctrination, have been totally ignored by veterans' organizations, command authorities, political agencies, and Air Force party and Komsomol organizations. Many shortcomings are noted in this important area, however. A training conference for Air Force veterans who are actively participating in military-patriotic indoctrination of youth was devoted to further improving this work. Twice Hero of the Soviet Union Mar Avn A. Yefimov, commander in chief of the Air Force, and members of the Air Force Military Council took part in the conference. General officers and reserve officers, former pilots, navigators, political workers, and veterans of the Great Patriotic War and the USSR Armed Forces were invited to attend the conference. They included three-times Hero of the Soviet Union Mar Avn A. Kozhedub, twice Hero of the Soviet Union Col Gen Avn (Res) M. Odintsov, Heroes of the Soviet Union Col Gens Avn (Res) S. Golubev, S. Gorelov, G. Dolnikov, V. Reshetnikov, and others.

The assembled veterans listened with interest to a presentation on the fundamentals of Soviet military doctrine, on progress being made by perestroyka in the Air Force, and on the tasks facing the Air Force. The

presentation stressed in particular that the 19th All-Union CPSU Conference focuses defense organizational development toward qualitative parameters—both in respect to science and technology and regarding the professional development of personnel.

The defensive nature of Soviet military doctrine and improvement of Air Force qualitative characteristics from the standpoint of composition presupposes a structure which ensures maximum conformity with this service's mission, fullest implementation of existing combat capabilities, and absolute performance of assigned missions with minimum expenditures of assets and resources. Improvement of qualitative parameters is achieved by improving the system of command and control, by boosting the level of operational and combat training, and by all-out intensification of training.

It was noted that the process of perestroika which is taking place in the Air Force is compelling one first and foremost to take a new look at many established forms and methods of training command cadres. Perestroika demands a break from the old stereotypes of thinking and a more responsible and demanding approach to things. A high level of knowledgeability, competence, and party integrity advance to the forefront.

It was stated further that the tasks of combat training can be successfully accomplished only with a high quality of the training process. Practical realities demand that one raise first of all the level of tactical training as the basis for tactical and flying proficiency of Air Force units and subunits. The ability to carry out the assigned mission with the least expenditure of manpower and resources—this is what should define the degree of combat capability of the squadron, regiment, etc.

Training facilities also require further improvement.

A special role in accomplishing these tasks is played by strengthening military discipline. Military discipline constitutes at the same time a condition, a means, and a guarantee of the success of perestroika and renewal of life in the military.

The presentation stressed that following the defensive character of Soviet military doctrine and a focus on qualitative parameters requires further buildup of efforts to activate the human factor, without which implementation of qualitative indices is impossible. The Air Force can reach a qualitatively new level of operational readiness, combat training and discipline only through people's activity, through their initiative and innovativeness, through their conscientious labor, cohesiveness, and self-sacrifice.

Proceeding from enhancement of the role of the human factor, restructuring of the system of military-patriotic indoctrination of youth is a task of paramount importance today. The goals and tasks of this work were discussed at the training conference. It was noted that some young people are euphoric over the positive processes and advocate a further unilateral 50-percent

reduction of the USSR Armed Forces, a change to forming the army on the basis of a territorial-militia principle, and favor national or ethnic military units, as well as essentially an all-volunteer army. Attacks on this country's Armed Forces by ill-wishers, nationalistic and extremist elements, and at times by the mass media as well, are aimed at undermining the system of military-patriotic indoctrination.

The activities of commanders, political agencies, headquarters staffs, party and Komsomol organizations of Air Force units and subunits contain a large amount of antidote to such fabrications and misapprehensions. These activities focus on strengthening the succession of generations in the Air Force and forming in each and every airman the finest traits of the warrior, patriot, and internationalist.

The veteran community also plays an enormous role in this. It makes sense to concentrate its efforts on working with induction-age youth. This category of young people, however, requires a well-thought-out approach. For this reason, it was emphasized at the training conference, it is essential to put new content into such traditional forms as excursions to sites of revolutionary, combat, and labor fame of the Soviet people and the Air Force, as well as military-type athletic games, lessons in courage, and various rituals and ceremonies. During get-togethers with young people one should more frequently lead the discussion to the topic of patriotic duty, friendship, our moral and spiritual values, and fighting traditions.

It is also very important actively to seek out and utilize new forms and techniques of military-patriotic indoctrination. It is necessary to speak out about the exploits of military aviators in Afghanistan, at Chernobyl, and in Armenia, and about their performance of their patriotic and internationalist duty. Veterans should also be prepared for dialogue. For example, on such a question as victory in the Great Patriotic War. It is no secret that numerous demagogic fabrications on this score have recently cropped up. Who better than veterans, direct participants in those events, can relate the truth about the heroic accomplishments of the Soviet people, the exploits of our military aviators, and cite concrete facts? Nor should one avoid debate-provoking issues. After all, who if not the participants in the events in question can present them historically truthfully and objectively?

Discussion of the heroic past must be combined with the Air Force's present. The discussion should motivate young people to carry out their civic duty with dignity and honor.

A great deal can also be done by the veteran community in stepping up inquiry effort and in strengthening ties with composers, writers, and artists who are active in the military-patriotism field, with general-curriculum schools, vocational schools, technical schools, etc. Stepping up interaction with soldier-internationalists, and not only pilots but also engineers, technicians,

mechanics, rear services and communications specialist personnel merits particular attention.

Currently-operating young cosmonaut, pilot and parachutist schools await veterans, as their experience and knowledge are needed. They will also serve as welcome assistants and mentors in the area of training and indoctrination in the special boarding schools offering primary flight training, which will be opening next year.

But wherever veterans happen to be, no matter whom they meet, it was emphasized at the session that the main thing is to conduct an honest, frank, lively discussion, not to separate oneself from one's audience by speaker's stands and presidiums, but to merge with them, to earn their trust and respect.

A constructive exchange of views and experience took place. The remarks made by Lt Gens Avn (Res) P. Terekhov and A. Blagoveshchenskiy and Hero of the Soviet Union Maj Gen Avn (Res) G. Bayevskiy touched upon the following: the need to improve military-patriotic indoctrination of youth; the need to utilize in a correct and intelligent manner the priceless experience of war veterans; how one can more rapidly eliminate negative phenomena in the daily lives of military collectives and how better to utilize the atmosphere of glasnost and perestroyka for training future defenders of the homeland. Concern about certain problems also sounded in their remarks. For example, concern about the poor degree to which part of the veteran community is politically, militarily, and technically informed, and concern over a lack of unity in resolving common issues on the part of various military and governmental establishments and political and public organizations. Unfortunately an unsystematic character prevails in military-patriotic work, with activities limited to holding a lesson in courage once a year at our schools. In the general view of those who attended the session, these and other problem issues must be resolved at the earliest possible time.

Participants in the training conference visited the air force base at Kubinka. There they met with primary-rank enlisted personnel, NCOs, warrant officers, and officers. A frank discussion was held, dealing with military duty and honor, problems of concern to military units, military service, living conditions, and off-duty activities.

This was followed by an aircraft display. Military pilots 1st class officers V. Bazhenov, A. Verozub, A. Zakharov, V. Solovyev, and A. Petrov, flying MiG-29's, displayed a high degree of flying skill. After this the Air Force veterans, many of whom had begun their aviation career on piston aircraft, inspected modern rotary-wing and fixed-wing aircraft, including the Tu-160, MiG-29, Su-17, Su-24, Su-25, and Su-27, and talked with pilots who had obtained combat experience in Afghanistan.

This was a serious conversation between combat pilots who were of different generations but who were bound

by a common destiny and a common feeling of love for their profession, the military, and the homeland.

It was the unanimous opinion of those who attended that the training conference had been both interesting and useful. The veterans were given the opportunity to become acquainted with what is happening in the Air Force today, to take a close look at the Air Force's assigned tasks and missions, and to define their own role and place in performing these tasks. There were also numerous suggestions that similar training conferences be held on a regular basis, not only at the level of the General Staff, the directorates of the Commander in Chief of the Air Force, and the Air Force Political Directorate, but also at the combined unit [division] and unit [regiment] level. Unquestionably they will help boost and improve work in the area of military-patriotic indoctrination of young people and will contribute to practical implementation of the demands of the 19th All-Union CPSU Conference.

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Training Pilots to Respond to In-Flight Emergencies

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[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by Col V. Smirnov, candidate of psychological sciences: "Go-Around...."]

[Text] (Candidate of Psychological Sciences Col V. Smirnov reflects on certain features in the training of pilots to take corrective actions in emergency situations)

* * *

Captain S. was on a night training flight in instrument meteorological conditions, shooting a standard instrument approach. The regimental commander, who happened to be in the control tower cab at the time, was concerned that visibility would be getting worse and ordered the flight operations officer to instruct the pilot to fly the approach and final descent in automatic mode. The tower passed on these instructions. The aircraft flew into a snow squall on final approach descent, and the pilot mistook the approach lights for the runway. After passing the middle marker, without having made runway visual contact, the pilot continued his descent while trying to make visual contact with the runway. As a result the fighter-bomber flew into the ground; the pilot succeeded in ejecting.

Could this accident have been avoided? Yes, it could have, if the pilot had possessed a high degree of psychological conditioning.

Simulation of in-flight emergencies is an effective way to form cognitive-intellectual qualities in a pilot. This can be done, for example, in the course of training sessions

on the flight simulator, when rehearsing flight procedures using the "walking it through" method [graphic representation with model aircraft], and in the course of checking readiness by presenting various scenario problems. The method is simple and easy to assimilate.

Then why does it sometimes fail to produce the required effect? In my opinion the main reason is the fact that in the course of training activities commanders pay little attention to creation of an information model of the flight. Pilots are not always given situation information which would enable them to form a sufficiently complete picture of the hazard element and to work out a safe solution. In addition, at times some commanders themselves do not know how to respond optimally in a given situation.

In particular, in the example described above the tower controller should have helped the pilot make a correct decision: he should have instructed him to abort the approach and to go around. What could be simpler? And yet practical experience indicates that air mishaps, including fatal accidents, are formed precisely of such simple components. What is the problem?

Psychologists have long since determined that it is sometimes very difficult for a person to make a decision to perform actions which have not been planned out in advance. In such a case it is better to execute a missed approach. In order to help the pilot cross the psychological barrier, it is necessary fairly frequently to have crews practice procedures involving departure from the planned sequence. Pilots should become accustomed to making such departures from the routine sequence of procedures. These could include aborting takeoff, extending a leg in the pattern in order to increase separation from an aircraft ahead in the landing sequence, aborting the approach and going around from various configurations, the aggregate of prescribed actions to take when losing contact with one's leader, and aborting mission execution at the range when hazardous changes occur in conditions of weapons delivery. The important thing is that air traffic controllers and pilots form a correct pattern of safe in-flight procedures.

It is true that sometimes even this may prove inadequate. The fact is that the most powerful effect is exerted by the motivational component of a person's mental and emotional makeup. In the above-described incident, if the pilot had developed motives of safe response behavior to a sufficient degree, he would have informed the tower about the deteriorating weather. He apparently failed to do so because other motives were dominant, in my opinion primarily the endeavor not to get the reputation in his unit of being a wimp, particularly since all other pilots during that flight operations shift had successfully completed their landing approach.

Influencing a pilot's psychological motivational domain is a most important area in efforts to ensure flight safety and one of the principal components of moral-psychological training of aviation personnel. Motivation

to observe safe procedures is formed primarily by the method of persuasion. One can employ individual and group discussions, lectures, party and Komsomol meetings, and visual agitation involving the presentation of specific instances of unsafe and safe pilot responses and procedures, with approval of the former and condemnation of the latter. The main thing is that commanders, political workers, and flight surgeons—all those who use words as a means of psychological influence on flight personnel—take part in this work.

Both the method of coercion and purely psychological devices can also be used at the same time to instill in flight personnel a sense of alertness ensuring that they do not get into heightened-risk situations. Psychological techniques include inculcation, formation of habits, imitation, and demonstration.

Several unique precepts have developed in the course of flight activities, precepts which are usually drummed into novice pilots. These formulas are at times somewhat crude, but they contain profound psychological sense. They reflect conditions of safe behavior by flight personnel. For example: "Carry out ground commands, but assess them critically, because the people on the ground are also human and can make mistakes," "A flight ends when the pilot climbs out of the cockpit," "When in the air count only on yourself," plus others.

Imitating or emulating a respected pilot has always been a most powerful psychological factor in aviation, which to a significant degree ensures safe behavior. A commander who foolishly engages in reckless derring-do, who operates at the edge of what regulations allow, should expect his subordinates to engage in like actions. And such recklessness can be displayed with equal probability both by veteran and novice pilots. Mistakes, and sometimes air mishaps, are almost inevitable. Instances of reckless derring-do by command personnel are dangerous first and foremost by virtue of their consequences. The commander's personal example also constitutes psychological training, of a positive or negative directional thrust. And a commander's influence is exerted continuously on flight personnel, regardless of whether superiors like it or not.

One should bear in mind that if a pilot does find himself in a difficult situation, either from his own initiative or for other reasons, the success of his subsequent actions is determined by special psychological qualities: preparedness for the unexpected, firm composure, and the ability to mobilize one's efforts and adjust for actions in a different, considerably more intensive mode. Prior to the onset of an emergency situation, a pilot usually has time to think through the situation, analyze its possible development, to "incorporate" ahead-of-events thinking, and to form a picture of what may occur, while in the process of development of the emergency situation proper he is frequently unable to do this. Lack of pilot preparedness to act in conditions where there is insufficient time and information available as well as inability to engage in nonstandard actions can have negative consequences.

From a psychological standpoint the difficulty of the majority of emergency situations lies primarily in the fact that the pilot must perform two difficult tasks simultaneously: form a new image of actions in an altered situation, and carry them out, as a rule at an accelerated pace.

Once again practice and drill can help flight personnel cope with these tasks. The effectiveness of this training is determined to a considerable degree by the content of the problem scenario and the method used in presenting the scenario. Experience indicates that in many units such training is limited to scenarios involving aircraft equipment malfunctions. As a result there is failure to work on response to many emergency situations which are not encountered so rarely that they can be ignored. Such situations include potential midair collision situations, dangerous deterioration of weather, difficult situations when flying in formation and during combat flying, etc.

There exists the opinion that knowledge of what actions should be taken is sufficient to prepare the pilot psychologically to respond to situations such as the one cited in this article. This is a very dangerous delusion, which must be vigorously combated! One must know not only what to do but how to do it as well. When a hazardous situation arises during actual flight, the pilot uses his willpower to "switch on" in his mind, as it were, the appropriate element of the response configuration, and he acts in conformity with this picture.

This is why both scenarios and the method of presenting them should not be contrived. They should be taken from practical flight experience. Unfortunately there still is essentially lacking a system of selection and classification of emergency situations, nor has there yet been developed a method of presenting appropriate scenarios proceeding from the complexity and frequency of situations which arise when flying aircraft of different types. As a result of all this, many instructive elements are ignored entirely in the process of psychological training of flight personnel. I feel that purposeful scientific-methodological development effort in this area will enable us to mobilize considerable reserve potential for improving flight safety.

Ideomotor drills, analysis of various difficult situations, and mental rehearsal of one's response actions are a beneficial supplement to training on the flight simulator. Whoever considers these supplementary activities to be outdated is wrong. It is no simple matter to master the required responses. Necessary elements include skills and ability, as well as considerable efforts to achieve mastery of what might be called the art of "mental flying." With sufficiently-developed powers of imagination, such drills can to a certain degree replace even practice sessions on the cockpit simulator. Another reason it is important to master this type of psychological training is that one can create a situation of any degree of complexity in one's mind, without the requirement of any additional equipment.

Studies indicate that fixed, standard general patterns play an extremely important role in flying. On the one hand this is a good thing, since the pilot, proceeding according to a predetermined program, frees his mind to process various information. On the other hand, however, frequent repetition of various elements of flight makes it more difficult for the pilot to emerge from the established patterns of actions. The pilot finds himself a prisoner, as it were, of a formed pattern of behavior. This is particularly typical of elements which occur repeatedly in a given flying mode, such as takeoff, landing approach, landing, maneuvers, and procedures in attacking air and ground targets. There have been many instances where, in spite of a dangerous situation change, a pilot has continued operating according to the preselected program, although the mistake of doing this was obvious.

Checking and testing readiness plays an important role in psychological training of flight personnel for emergency situations. As a rule commanders seek to make maximum utilization of testing and verification for these purposes. Some commanders, for example, when testing preparedness endeavor to maintain a highly-dynamic pace of scenario training and to ensure a diversity of scenarios. Nevertheless officers fail to consider a point which is extremely important in a psychological respect—the fact that the majority of emergency situations involve close coordination between flight personnel and ground controllers. When testing preparedness they fail to present a single scenario which would test the reliability and effectiveness of such interaction.

The fact is that many components of a pilot's mental and psychological makeup pertaining to emergency situations are not worked on as successfully as the situation requires. There is considerable reserve potential for improvement in organization and methodology of psychological training of flight personnel. It is extremely important to mobilize this potential and to put it to work for aviation personnel.

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Unit Propaganda Officer Discusses Ethnic Sensibilities, Nationalism

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[Article, published under the heading "Following a Policy of Perestroyka," by Maj Ye. Murygin, unit propaganda officer: "Facing Reality"]

[Text] Interethnic relations, even on the scale of a small military unit, are as brittle as glass and easily injured.

This should heighten our responsibility for the forming and shaping of interethnic relations. We must ask ourselves a question: do we always see the difference between manifestations of ethnic pride and of arrogance? The former engenders respect, while the latter engenders contempt. Unfortunately we often forget that

without ethnic or national consciousness there can be no internationalist consciousness.

I shall cite some examples. Officer V. Anatolyev was conducting a political briefing session for his men on the topic "Internationalist cohesiveness of the military unit." He mentioned the events which took place in December 1986, stating: "...Before the revolution Kazakhstan even imported nails from England...." Leaving the matter of the veracity of the cited fact to the propagandist's conscience, I shall merely note that following this statement one of the men, Pvt A. Turunkulov, requested permission to leave the classroom. He was a Kazakh.

Speaking with him later, I ascertained that he had felt insulted both for his people and for his republic. In addition he believed, and not without reason, that henceforth he might become the butt of jokes on the part of some of his fellow soldiers. Experienced political workers had to step in in order to smooth over this officer's mistake.

Or take the following incident. There was a Yakut serving with our unit, Pvt Ye. Zhergotov. On repeated occasions he would tell his comrades about the three Yakuts who had been awarded the title Hero of the Soviet Union during the Great Patriotic War. Once one of the officers commented in annoyance: "What is so great about these three people? Thousands were awarded this title." The soldier looked at him in bewilderment and said that he knew about many heroes—Russians and Ukrainians—so why should their fellow countrymen not learn about three Yakut heroes?

Yes, for a long period of time we sought to suppress ethnic feelings in our people. And I believe we were wrong.

Somebody might retort: "If you give free rein to ethnic feelings, will interethnic conflicts not start making their presence known?" I would like to say first of all that interethnic conflicts also existed in the past to some degree. Secondly, squarely facing the truth, we must recognize the negative elements in interethnic relations and, proceeding from this, resolve our problems.

But how? It is not an easy question, and it is difficult to give an unequivocal answer. An author of an article which appeared in this magazine stated, for example: "...The available arsenal of forms and methods of work on internationalist indoctrination of military personnel is not being fully utilized." But just who has determined what the full extent is? Our work in past years has shown that it is precisely the vast number of measures and actions which led to stagnation. Therefore in my opinion the main thing is not quantity but quality and effectiveness. I feel that this should be the tactics in our ideological work today.

For example, ethnic cuisine days are held in our garrison. Recently we had an Uzbek cuisine day. The men enthusiastically tried plov and other dishes prepared by Uzbek

soldiers. The dinner was accompanied by ethnic music. It was not only tasty but a lot of fun as well. The men have fond memories of that day and speak warmly about their Uzbek comrades who offered them such a fun event. The result is a basis for improving interethnic relations. We see and take note of this. Similar events will be arranged and held, even if fairly infrequently.

Some stickler for lip-service form might ask: why not do it often, if such events are effective? But a knowledgeable individual realizes that any organized event requires thorough preparations. Officers Yu. Kolesnikov and R. Gafarov, for example, who are Komsomol activists in our unit, did not have an easy time with getting this event on its feet. They were faced with a great many problems, which were not so easy to resolve.

I shall name just a few: where is one to obtain the required foodstuffs, ingredients, spices, ethnic costumes, and phonograph records? How can one arrange for the unit medical officer to give permission for the Uzbek cooks to go through the entire medical checkup procedure and to clear them for kitchen duty? Such prosaic matters are not covered in the formal reports, but they are essential in any undertaking.

The slogan "better less but better," however, does not speak against diversity of measures. One should think about this as well.

I would also like to say a few words about boring didacticism. I personally am against an oversimplified interpretation of facts and events. But I am also against what some propagandists do, constructing a lecture or discussion exclusively on the foundation of a single military unit, with people, like it or not, becoming encased within a limited range of problems. And here we have the authors of some articles in NEDELYA, LITERATURNAYA GAZETA, OGONEK, and KOMSOMOLSKAYA PRAVDA, as well as some TV broadcasts claiming that soldiers not only fail to develop during their years of military service but even lose their intellectual potential. I cannot agree with them, but I would like to comment that we need to do everything we can to ensure that each and every military collective, each and every serviceman gains a good grasp of domestic and international events and can make a reasoned judgment on all things. Education plays an important role here.

I had the following experience. There was a Lithuanian private by the name of Ya. Grisliis in our unit. He had been studying at a seminary prior to being drafted. As a propagandist, I conducted antireligious discussions with him and gave him various newspapers and magazines to read. As time passed, however, I could see no results from my efforts. I subsequently learned that this soldier's relatives had been regularly sending him quite different literature and in this manner had been "spiritually" reinforcing him.

Why am I saying this? Because at the present time many subunits are subscribing to newspapers in the languages of the union republics. But some of them are probably

filled with the poison of nationalist propaganda. This frequently poisons the men's consciousness and destroys the good foundation that has been laid down by their superiors, political workers, and fellow soldiers. I feel that we cannot allow such a powerful means of education and indoctrination simply to drift along. And in any case we cannot relax our attention toward newspapers and magazines in the Russian language. First of all, we are always able to present commentary on them, and this will be useful and educational. Secondly, such reading is a supplementary means of instruction for those who have a poor mastery of the Russian language.

Of course these problems must be resolved, but we frequently merely grope our way along, acting in an unorganized and uncoordinated manner. It would not be a bad idea to have appropriate methods and synthesized experience and know-how, for example, on how to forge friendship between a Chechen and an Ingush, how to spot a mullah among a dozen young conscripts arriving from the southern republics, as well as pertaining to a number of other items.

I am confident that unoriginal forms and circulars will not help things. Only experience, knowledge, situation analysis, and an innovative search for ways to solve problems can ensure success in such an important matter as internationalist indoctrination of military personnel.

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Protecting Aircraft During Periods of Inactivity, Winter Storage

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[Article, published under the heading "Advice to the Aviation Engineer Service Specialist," by Col V. Doroshkov and Capt 1st Rank V. Osminov, candidates of technical sciences: "Critical Phase of Operation and Maintenance"]

[Text] Experience in the storage, care and maintenance of fixed-wing and rotary-wing aircraft, including experience in other countries, indicates that the following are optimal prolonged inactivity and storage conditions: ambient temperature, 5-15° C; temperature fluctuations over a 24-hour period, not more than 5° C; relative humidity, 40-50 percent; to the extent possible, absence of external factors causing equipment corrosion, aging, and damage due to biological factors. Of course environmental parameters in various parts of our country differ considerably from the recommended figures. Nevertheless, as is indicated by the practical experience of Vanguard units, it is possible to ensure the good condition of equipment over an extended period of inactivity or storage. This requires using modern methods and means of temporary combined protection according to established practices, taking into account climatic storage regions, that is, aircraft konservatsiya [corrosion prevention (protection)]. Unfortunately Air Force maintenance

people do not consider this to be a critical matter and sometimes perform procedures "by guesstimate" and following obsolete care and maintenance procedures.

In particular, at the present time there is no uniform, clear-cut definition of the term konservatsiya (translated from Latin as "preservation"). In GOST 9.103-78 it is defined as performing temporary anticorrosion protection of metals and various items following specified procedures. Thus konservatsiya is equated only with temporary corrosion protection, which does not fully reflect its substance. In our opinion a more complete definition would be the provision of temporary combined protection of items against corrosion, aging, and biologically-induced damage following established procedures, for the purpose of ensuring reliable safeguarding during a period of inactivity. This definition should be construed to mean not only means and methods which retard processes of corrosion, aging, and biologically-induced damage, but also means employed to seal (isolate) an object from external factors (covers, polymer and metallized films, sealed packagings). New materials with excellent anticorrosion properties have also been developed in recent years. Principal types of procedures to provide temporary protection to machinery-type items include application of protective oils and greases, wipe-off and wash-off inhibitor-incorporating coatings, corrosion inhibitors, as well as corrosion prevention by dehumidification and using inert gases. As a rule each of these provides selective protection for specific types of equipment, equipment parts, assemblies, and component units, and is insufficiently effective or entirely unsuited for other types of items. This is why it is advisable to employ for such complex items as aircraft a system of intelligently-selected variations and means of combined protection which ensure minimal material and labor outlays in the process of storage, and which at the same time are ready to use without undue preliminary preparation.

A combined method, using lubricating, preservative lubricating, and preservative oils and greases in combination with wash-off and wipe-off inhibitor-incorporating polymer coatings, utilization of inert (protective) media, dehumidification and means of sealing, is most extensively employed to protect aircraft.

MS-8rk lubricating and preservative oil or mixtures of MS-8p or MK-8 oils and 10 percent AKOR-1 oil-soluble inhibitor are used as lubricating and preservative lubricating oils for aircraft engine internal protection. It is important to note that for powerplant systems operating on IPM-10, B-3V, VNIINP-5-1-4F and similar synthetic oils, these procedures must be performed with lubricating oils specific to engine type. Work is presently continuing on utilization of IPM-10rk preservative lubricating oil for these purposes, as this oil possesses better protective properties than synthetic oils. In order to maintain a high degree of operational readiness and to reduce labor expenditures, engine external corrosion protection procedures are not recommended.

K-17 preservative oil, GOI-54P grease or AMS-3 lubricant are used to protect aircraft against corrosion. They are applied to unpainted surfaces of components, parts and assemblies of the airframe and airframe systems, electronic and other aircraft equipment (with the exception of oxygen equipment) located inside the airframe. PVK, a more viscous lubricant, is recommended for protecting unpainted exterior airframe and airframe systems surfaces as well as landing gear and associated components. In order to avoid dust (sand) accumulation on coated surfaces and to provide additional protection against precipitation, it is advisable to wrap items with one to two layers of waxed or capacitor paper and a layer of polyethylene film.

Recommended wipe-off or wash-off protective coatings include EVVD-13 water-and-wax compound, which consists of a waxlike substance with special additives dispersed in water. It is nontoxic, nonflammable, and environmentally safe. The film which forms on the protected surface possesses water-repelling and barrier properties. The most recommended use of this compound is for protection of rubber and other polymer products (including paints) against aging and biologically-induced damage, as well as protection of unpainted metal surfaces against corrosion. EVVD-13 can be used as a sealant material for riveted connections and between adjacent airframe skin panels. Surfaces coated with EVVD-13 do not require protective coating removal when readying an item for operational use. We must stress, however, that this compound is a water-dispersed material, which means that it cannot be used to protect electrical current-carrying lines and components. For these applications it is recommended that one use an easily-removable coating (LSP) based on KhV-114 red-brown enamel and AKOR-1 corrosion inhibitor, which forms a hard, shiny dark-brown protective film on the target surface. XV-114 enamel based LSP is recommended primarily to protect parts and assemblies located within the fuselage or not subjected to direct exposure to the sun, since this causes it fairly rapidly to lose its protective properties. LSP is most widely used to protect joined plug connectors. To protect unjoined plug connectors one should use covers with beading or flanging of polyethylene film not less than 0.15 mm thick, first wrapping the plug connector with capacitor paper.

PE-37A polymer coating, which is manufactured in ready-to-use form, can be used to protect rubber items (air system hoses, shock absorbers, seals, gaskets, rubber tube-type sealing or weatherstripping). BR-1 ("Kalosha") diluting agent or B-70 gasoline can be used to dilute it to the proper viscosity.

It is recommended that one use folgoplen [foil film], 500 fabric, AM-93 fabric, or AST-100 cloth for direct protection against atmospheric precipitation and for sealing (sealing inspection covers, fillets, connections and joints). Foil film consists of aluminum foil with a sticky underlayer of polymer adhesive. It is commercially manufactured in the form of individual sheets measuring 460

x 790 mm. It is simple and easy to use. Just prior to sealing, foil film sheets are cut up into strips of the required shape and width. The protective paper is removed from the sticky side, and the foil film is applied, sticky side down, to a clean surface and rolled down with a rubber roller. Then, if possible, it is thoroughly pressed to remove any lingering air bubbles and to ensure a perfectly smooth surface. One or two layers of EVVD-13 compound should be sprayed (or brushed) onto the foil film strip, with coverage extending two or 3 centimeters over onto unprotected surface.

AS-16 varnish mixed with aluminum powder in a ratio of 5 to 1 (by weight) is used to protect aircraft tires against the effects of sunlight. Two coats of varnish are applied, using smooth brushstrokes with progressively decreasing pressure on the brush. After the varnish coats have been applied, it is advisable to apply two or three coats of EVVD-13 compound to the varnish surface.

Cockpits and cabins should be protected with a combination of applying K-17 oil to unpainted surfaces, keeping interior air dry with industrial-grade silica gel, and by sealing the cockpit or cabin.

Of the inert and neutral gases, industrial-grade nitrogen is widely used for the protective storage of aircraft. The range of items and materials which can be protected with nitrogen is virtually unlimited, but for reasons of difficulty in ensuring an effective airtight seal, especially for large and complex-shape volume areas, nitrogen is used to protect fuel, air and fire-extinguishing lines and systems, hydraulic accumulators, and weapon reloading systems.

External protection procedures on aircraft should be performed at ambient temperatures not below +10° Celsius and at relative humidity not in excess of 80 percent. This must be preceded by 24-month routine inspection, servicing and maintenance procedures as a minimum, in the course of which one should thoroughly remove dirt and corrosion products and restore protective painted surfaces to specs. Interior surfaces must be thoroughly dried, drained of water condensation, air and other system filters dried, with all drain openings inspected and cleaned out.

Location is of considerable importance when aircraft are stored in the open. Storage sites should not be subject to flooding by streams leaving their banks or by downpour runoff; they should be hard-surfaced, and the surface should have at least a two-degree slope for water runoff. Storage sites should not lie adjacent to swamps or marshes, lakes or other bodies of water, should not be exposed to winds, and should not be at locations where the water table is closer than 0.5 m below the ground surface. It is advisable to position aircraft facing south in order to reduce the accumulation of condensed precipitation on one side of the aircraft.

Storage of military equipment of various types is a complex and critical phase of equipment care and maintenance. But experience indicates that when one

approaches this difficult task with a proper degree of understanding and performs it in a methodologically correct and knowledgeable manner, good results are achieved even in climatic regions which are unfavorable to equipment storage.

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Pilots Unfairly Blamed For Air Mishaps

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[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by Military Pilot-Expert Marksman Col A. Kharchevskiy and Military Pilot 1st Class Maj A. Ziziko: "Guilty Without Guilt?"]

[Text] In his book entitled "Chelovek letayushchiy" [Flying Man], A. Markusha writes: "Judging from archival materials (1911-1912), and there is some doubt as to their absolute reliability, approximately 70 percent of fatal accidents have been caused through the fault of the pilots...." The doubts entertained by this former combat and test pilot as to the degree to which pilots are to blame for fatal accidents are not mere happenstance. Both in the past and today certain aspects of air accidents remain unclarified. There are various reasons for this....

I should note at the outset that this is not only our problem. An aircraft accident involving a Boeing 727 took place at Raleigh-Durham airport (USA) on 12 November 1975. The accident investigation board's initial conclusion in 1975 was that the accident had been due to pilot error while flying a landing approach in instrument weather. The truth was not ascertained until 8 years later (!): in the final phase of the landing approach the aircraft, in heavy rain, had encountered a wind shear, with associated downdrafts.

We should state that scientists have been working for more than 20 years now on development of methods of combating the adverse effect of so-called wind shear. But they have been unable to accomplish this to date, as is indicated by aviation experience. According to the figures of experts abroad, from 1964 through 1985 there occurred at least 26 fatal accidents and 3 non-fatal accidents during takeoff and landing just in U.S. civil aviation, with wind shear being the main or associated cause.

Of course similar air accidents had also taken place prior to 1964, and on each occasion the finger of blame was pointed at the flight crew. And yet these accidents are connected only with weather and weather reporting factors! Who can say precisely how many pilots, navigators, and flight engineers have been made the victim of unexplained circumstances, assuming the role of guilty party without guilt? For example, official statistics on air mishaps and mishap-threatening incidents in Soviet Air Force units (in the last decade) indicate that flight

personnel were culpable in approximately one third of all cases. It is high time for all of us—scientists, commanders, pilots, and engineers—to endeavor to analyze the objectivity of these adverse figures. Without determining the truth there is no point in talking about effectively increasing the level of flight safety. At the moment this truth is rather hazy.

Let us turn to some practical examples from Air Force combat training.

Less than an hour after Capt I. Kazakov's two-ship element commenced alert duty, they received mock combat scenario instructions for one aircraft to scramble. The element leader proceeded to take the mission. His engine start attempt failed, however. The mission was taken by his wingman, who was more than able to make up for the time lost by Captain Kazakov on the unsuccessful engine start attempt.

An alert-duty flight failure to scramble is an unusual occurrence. An investigation of the incident naturally followed. A repeat attempt to start the engine was successful. The regiment's deputy commander for aviation engineer service, Lt Col Chertorizhskiy, reached the following conclusion: in the process of readying for engine start and during the engine startup procedure, the pilot had failed fully to carry out engine starting procedures and had failed to adhere to the engine start sequence as prescribed by the aircraft operating manual. The conclusion would appear to be logical, but Captain Kazakov stubbornly argued against it. But his efforts were in vain. The following was reported to the higher echelon: "...Incorrect cockpit procedures. Pilot culpable."

Soon there began to cascade noisily down from the higher echelon a stream of organizational conclusions, administrative and party penalties against the guilty party. It is hard to say whether or not Kazakov would have survived under this heavy weight if the same thing had not happened once again on the same aircraft, but this time to a different pilot. An intermittent malfunction in the engine starting system proved to be the actual cause of the incident. But what about the pilot who had been made the scapegoat? Was he given an apology or was at least an announcement made at formation that he had not been to blame? Not on your life! Those who had furiously attacked him, using available official means at hand, proved to be very timid when it came to reversing field. Kazakov's black mark was officially expunged only after he submitted a written request to that effect to the regimental commander.

We have repeatedly taken part in heated debates on the subject of determining the actual causes of specific air mishaps and mishap-threatening incidents. Sometimes pilots totally disagree with the findings of the investigation board. But it does them little good! It is very difficult for a pilot to prove his innocence, since there is nothing to protect him against a subjective, arbitrary administrative ruling. It is probably for this reason that

we pilots have an unfortunate saying: you are guilty as soon as climb into the cockpit. This saying essentially expresses our despair, our powerlessness, our fatalism, if you were, in the struggle for an objective evaluation of actions by flight personnel and, in the final analysis, for our professional honor. Is a pilot always so subjective in assessing his own flying ability as some higher-ups would claim? Remembering the criterion of truth, let us turn to practical experience.

During large-scale flight personnel conversion training to a new aircraft differing from its predecessors chiefly in its high performance and handling characteristics, within a short period of time several near-accident incidents took place in Air Force units, an analysis of which fairly clearly displays a number of typical symptoms. They are essentially as follows.

Unintentionally exceeding the maximum allowable angle of attack on aircraft of the same type.

Exceeding limits when practicing air-to-air combat with "enemy" fighters (fewer such cases when practicing flying technique as a two-ship element; even fewer during single-aircraft training flights to practice flying skills or aerobatic maneuvers).

In all near-mishap incidents pilot error in aircraft handling was determined as the cause.

As we see, pilots were determined to be the culpable parties in all cases. Thus mishap-threatening incidents were caused for the most part by highly-skilled pilots.

We shall now take a closer look at this group of incidents. To accomplish this we must construct at least a general model of the psychophysiological picture of the process of aircraft control by a human operator at the moment an error or deviation occurs or, to couch it in terms of deviation psychology, we must examine the pilot information sequence diagram.

One of the most important features of controlling an aircraft in the process of maneuvering air-to-air combat when there is visual contact with the adversary is a structure of collection and processing of information on the flight of one's own aircraft which differs from any other type of flight. The acute need to see and know the position of all aircraft (friendly and hostile) involved in the air engagement results in considerable work-loading of the visual (primary) information perception channel. In other words, in the course of maneuvering combat the pilot's gaze cannot be focused long in the cockpit, such as, for example, when executing even the most complicated aerobatic maneuvers. This also applies to a somewhat lesser degree to multiple-aircraft training flight for the purpose of practicing formation flying technique. For this reason the pilot is simply unable continuously to monitor visually the value of any specific flight parameter (angle of attack or G force).

At this point one generally brings up the role of "feeling of the aircraft," that is, a pilot's ability to sense, within a

certain allowable range of error, his aircraft's current angle of attack. On fighters of previous generations this was indeed possible due to the occurrence of typical aerodynamic buffeting, initially a slight shaking, which becomes greater as the angle of attack increases. A pilot could also determine that limits had been exceeded on the basis of "flying the aircraft by its nose," after which one wing would stall and the aircraft would enter a spin. In certain Mach number conditions it would be impossible to recover when exceeding angle of attack and G-force limits, due to insufficient stabilizer effectiveness.

But all that was yesterday. Today the aerodynamics of modern fighters are such that these things do not occur. The operational envelope has substantially increased. Buffeting rarely occurs, and the stabilizer is sufficiently effective to recover beyond the operating envelope throughout the entire range of Mach numbers. Therefore, when talking about "feeling of the aircraft" in present-day conditions, one must add the comment that it is true that angle of attack is in a strictly determined relationship with many other flight parameters as well as with the magnitude of control forces on an aircraft's control surfaces. But it is important to bear in mind that these relationships are so diversified in different flight configurations as regards airspeed, altitude, G forces, and engine thrust that it is virtually impossible to feel them. It is also essential to be aware of the fact that the thresholds of sensitivity of human sense organs also change with change in G forces.

In view of all this, engineers began incorporating special automatic safety devices or limiters into the aircraft control system. The purpose of these devices is to help the pilot avoid entering a dangerous flight configuration. If such a limiter is lacking, it is precisely this fact, not pilot error, which is the primary cause for an aircraft entering a hazardous flight configuration.

A limiting device should be adjusted to respond at a value which should not be exceeded for safety considerations. If we consider angle of attack, there are various reasons for imposing a limit: spin, opposite response by the aircraft to control deflection, divergence, etc.

In order to make fuller use of an aircraft's capabilities, it sometimes is necessary to be guided by a fairly complex system of restrictions. For example, the aerodynamics of the U.S. F-16 fighter are such that at angles of attack close to the stalling point, roll controllability worsens to the point of occurrence of opposite response. To introduce angle of attack limits and to adjust the safety system to a lower level, corresponding to the condition of preventing opposite response, means decreasing the fighter's maneuver capabilities. Such a less than optimal solution to the problem can be avoided by using a limiter, but in this case in the roll control channel.

Maximum allowable angle of attack depends in turn on such flight parameters and factors as airspeed (Mach number), aircraft weight, type of external stores

mounting, single-aircraft or formation flight, and level of aircrew proficiency. Of course limiter (limiter system or safety system) adjustment should be varied in conformity with changes in allowable angle of attack. Otherwise the fighter's capabilities are either "truncated" or there is a probability of unintentionally exceeding limits.

One typical symptom linking this group of mishap-threatening situations is the fact that they occurred on aircraft of a single type. On the aircraft flown in our unit, for example, adjustment of the safety system, as well as its very function, fail to meet requirements which express objectively existing laws of safe operation of the "pilot-aircraft" system. It is presumably for this same reason that the limiter cut-in point presently (as is stated in the operating manuals) differs by several degrees from the maximum allowable angle of attack (the former is greater).

We must also note that at angles of attack close to maximum allowable, an aircraft possesses somewhat greater controllability, while the allowable angle reading on the angle of attack indicator is to some degree of a misinforming or indeterminate nature. As a result the line-unit pilot is faced with a virtually unresolvable problem: on the one hand he must fully ensure flight safety (in particular, avoid exceeding maximum angle of attack), while on the other hand he must be able to use his combat aircraft across the full performance envelope in air-to-air combat (where it is simply impossible constantly to monitor the angle of attack indicator). The impossibility of this task has caused mishap-threatening incidents, for which flight personnel are sweepingly and persistently blamed. In other words, weakness of the "aircraft" link in the "pilot-aircraft" system is carefully concealed by pilot "errors." The Ministry of the Aviation Industry prizes the honor of the uniform [values its reputation]! But should we pilots continue forever performing the role of "spot remover" on that uniform?

We should note that what is stated above does not apply to those instances where exceeding maximum angle of attack was caused by loss of indicated airspeed toward the top of a maneuver executed in close to vertical planes.

Loss of controllability (total or partial) occurs when one exceeds angle of attack limits; aircraft structural failure (or structural failure of some part of the aircraft) occurs when exceeding G force limits. In combat conditions this can lead to increased probability of enemy victory. In peacetime this is correctly characterized as diminished flight safety. It is obvious that an aircraft which possesses outstanding performance characteristics and which carries potent armament cannot always be utilized to full performance in combat, and this also applies to full-performance combat training.

The need to utilize an aircraft to the full extent of its performance characteristics in the course of combat training, the focus in determining the limits of which is grounded on the functioning of the "aircraft" element in

the "pilot-aircraft" system in determining performance limits by preliminary performance testing, and subsequently in the process of communicating these limits to the pilots in the line units, as a rule fosters the occurrence of air mishaps and mishap-threatening incidents. This is logically followed by prohibitions or restrictions....

Incorrect determination of the actual cause of an air mishap and the guilty party leads to a situation where all preventive measures are focused not on correcting defects in the aircraft but on preventing "erroneous" actions by the human operator. Here is how this happens in practice.

Following incorrect determination of cause and designation (precisely designation!) of the person to blame for a mishap-threatening situation or an air accident, events subsequently develop according to the traditional scenario. The pilot is grounded for a certain period of time, during which he loses his proficiency. His superiors and party officials apply corrective measures. Subsequently he is obliged to pass tests on specific aviation subjects. After this he takes an additional dual-trainer check ride. But even after this the process of "cleansing from sins" continues. The name of the officer who is guilty without guilt long continues to be brought up at meetings, at training flight briefings, etc. This continues until somebody else gets into a similar situation.

Initial measures to prevent the reoccurrence of a situation, involving additional training classes in aerodynamics and flight dynamics, analyses of mishap-threatening situations and punishment of "guilty parties," fail to produce the desired results, and they will continue to fail! There are certain logical patterns and mechanisms here as well.

Some commanders in line units, in order to avoid similar incidents from happening again, utilize safety slogans, place even greater restrictions on flight configurations, and punish "guilty parties" even more severely. The pilots, who have felt on their own skin the blows of the administrative and party knout, who have become convinced that they are totally without rights and are unable to defend the honor of the professional, have no other recourse but to simplify training flights. In order to accomplish the performance-graded missile firings and to observe safety conditions dictated from above, flight personnel must perform maneuvers which have been stipulated and discussed in advance. But this gives rise to unoriginal, predictable-pattern actions. Thus, figuratively speaking, combat readiness is given a punch below the belt. In addition, flight safety also suffers. Is it not high time for us to renounce excessively-simplified approaches to analysis of our activities? We believe that the time has come to reexamine views on the essence and substance of air accidents and mishap-threatening incidents. If this is not done, we shall continue endlessly engaging in the reporting of unpleasant facts.

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Volgograd AF Colonel-Reformist Elected People's Deputy

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[Article, published under the heading "Brushstrokes to a Portrait," by AVIATSIYA I KOSMONAVTIKA special correspondent Lt Col V. Larin: "Deputy From Kacha"]

[Text] USSR People's Deputy Lt Col B. Pylin: "I feel that one of the paramount tasks pertaining to stepping up the pace of perestroika in the Armed Forces and in the Air Force is to give unit commanders greater independence in planning, scheduling, and organizing combat training and in handling administrative, personnel, economic, and other matters. Line units and subunits should be enabled to engage exclusively in combat training, with all house-keeping and other secondary concerns handled by the support services."

* * *

Of medium stature and well-proportioned, Boris Filippovich strides to the rostrum with a lively step and relaxed appearance, casts a glance around the classroom, looking into the faces of the assembled cadets—for the experienced teacher an unerring barometer of the audience's mood.

At these moments just before beginning a class on air-force tactics, Pylin feels like a commander who is about to lead into battle young pilots who have not yet seen combat. And the task must be accomplished in such a manner that the lessons of combat skill remain in the cadets' memory and tactical arsenal throughout their entire flying career.

Do Lt Col B. Pylin and his comrades succeed in achieving such a high degree of effectiveness of the training process?

Judging from the opinion of the school's leader-Communists, instructor pilots, as well as comments from the line units about graduates of the Kacha Higher Military Aviation School for Pilots, the labor expended by the instructors in the tactics department is reflected well in the continued training and service of graduates of our country's oldest flight school.

The very fact that the people at the Kacha school unanimously nominated senior instructor Boris Filippovich Pylin candidate for USSR People's Deputy from the Sovetskiy Electoral District, No 139, in the city of Volgograd, helped and supported him in his election campaign and subsequently in his efforts as people's deputy constitutes the best evidence of deep respect for and trust in this officer-Communist.

We should state that Kacha has never had an unworthy representative in elected bodies. Today, just as in the past, the most highly-respected commanders, political workers, and teaching faculty members are working

actively as members of soviets of people's deputies. But in the course of these most recent elections the school and the electoral district experienced for the first time the election of a deputy who himself had presented his own candidacy for discussion at a preelection meeting, backing up such a step, an unexpected step as far as many Air Force people are concerned, with presentation of a well thought-out and practical platform, in conformity with the goals and tasks of perestroika.

Improving his platform from one get-together with Volgograd voters to the next, Lieutenant Colonel Pylin successfully made it through the election-campaign marathon. Seven candidates for the office of deputy from Volgograd's Sovetskiy Territorial Electoral District lost to him in an honest, open campaign to win the vote of more than 300,000 voters.

But why Pylin? I heard the most varied opinions in response to this question. It is unquestionably an important element that he is a native son of Volgograd and is acquainted with the problems of the city and its people by more than hearsay. People were favorably impressed by the specific thrust of Boris Filippovich's campaign toward immediate implementation of political reform, the resolving of social issues, and the fact that man, with his spiritual and intellectual aspirations and material needs, always stood at the center of planned reforms.

But other candidates also presented the voters not only with slogans of perestroika. I believe that Pylin's strength was manifested in his very high sense of citizenship and his ability not to give up his convictions or life principles under any circumstances. Even when you very first meet this officer you sense then presence of a strong, outstanding individual capable of fighting for his ideals to the very end and of leading others in that fight.

He never sought devious paths in his life and military service, and he was equally demanding on those around him. Prior to enrolling at the Kacha Higher Military Aviation School, Pylin had worked on a loading dock and was attending night school at the same time. Upon graduating from Kacha he was stationed in the Transcaucasus. He mastered the MiG-23 and was considered to be a highly-promising pilot. But fate apparently did not intend him to fly: he began developing near-sightedness. He was transferred to a staff assignment. He proved to be a capable operations officer. In 1981 he graduated with honors from the Military Air Academy imeni Yu. A. Gagarin, served with the Southern Group of Forces, and subsequently enrolled in postgraduate study. Five years ago he returned to Kacha as an instructor.

With these brief brushstrokes from the biography of Lt Col B. Pylin one can easily sketch the portrait of a typical person who is lucky in life. The fact is, however, that everything did not proceed so easily and smoothly in his life, a substantial segment of which coincided with the period of stagnation. Feeling repugnance toward all manifestations of injustice, patronage, influence, and

obsequiousness, he fought actively and at all times against bearers of ethics and morality which were alien to him as an officer and a Communist. There were many who did not like Boris Filippovich's straightforwardness and forthright integrity. Not for one single instant, however, did Pylin retreat from his convictions or compromise with his conscience.

I feel that one voter very precisely noted the sensory aspect of the perception of Pylin by those around him: "He is unusual. He thinks in an unconventional manner. But it is evident that he is a man of action."

In what way is this lieutenant colonel from Kacha unusual as far as many are concerned?

I would compare him with a ship which has returned to port following a long voyage without a "beard" of barnacles and algae on its hull. A rare occurrence.... But here we have a person who has lived almost 40 years in the thick of "good and varied" events and who succeeded in maintaining his soul in a state of pristine purity. He says what he thinks, acts according to his conscience, and does not attempt to appear better than he is. It is of course unusual to see and hear all this for people out of whom a system of rule by administrative fiat attempted over the course of decades—and not unsuccessfully—to stamp out voiceless, compliant "cogs."

And to be quite honest, this was the first time in my professional career as a military man and as a journalist that I had encountered an Air Force officer and Communist who had never been the target of abuse, who in a letter to L. I. Brezhnev had openly and forthrightly endeavored to persuade him of the need to step down from his lofty posts. He had directed letters and suggestions to the 27th CPSU Congress and to the 19th All-Union Party Conference.

Pylin of course knew that the local leadership was by no means delighted at such tireless initiative "from below" and that unpleasant consequences could ensue. But he was unable to remain silent and do nothing.

For more than two years, for example, Boris Filippovich studied the state of and growth prospects for housing construction in this country and abroad before reaching the conclusion that the future belonged to individual, private construction and an industry supporting such construction. He forwarded his proposals to the USSR Council of Ministers. Pylin brought to the Congress of People's Deputies three variations of solution just to environmental problems. These solutions are also the result of long thought and inquiry.

Some people express surprise: "A strange individual! Why bother with all these concerns when he himself has reached a pretty fair level of prosperity?"

Of course it is difficult for such people to understand Pylin. Even today selfless service to the people is perceived by them as some kind of strange whim, an endeavor to stand apart from the masses.

"I recently came across a phrase in a periodical which really struck me," Boris Filippovich commented in our interview. "The statement was to the effect that our wrinkled dignity had become something in the line of a national trait, that we had become little people.... There can be no little people in a great country, among a great nation. I am convinced of this. I therefore want, together with people of like mind, to create conditions for the Soviet citizen to stand up to full stature, to feel his own significance, to feel that he is receiving attention, for all of us to live worthily and well. We have had it with hoping for the favor of our superiors, being handed sops by the all-powerful government agencies, for awakening of love of man within the bureaucracy. Miracles do not happen. They must be created with one's mind and hands."

I should add to Pylin's words that these thoughts found concrete embodiment in his campaign platform, and now in his legislative activities.

In a conversation with Boris Filippovich, which took place in a break between meetings between this USSR People's Deputy and representatives of workforces and initiative groups, he told me about those things which concern him today.

"It is important, you see, to give thought right now to how we want the local soviets to be. Figure it out for yourself: in our electoral district there are more than 1,500 deputies. You can imagine what a force this could be in the campaign for perestroika! But what is actually happening?

"Immediately following the elections I was literally flooded with letters, complaints, and requests to help with the repair of apartments, installation of telephones, and other everyday needs. I am doing the best I can to settle all problems, but it is too much for one person to do, and one can easily drown in daily routine, as they say. I advise people to turn to the deputies to the local soviets, but they refuse. Apparently they do not believe that they will help. A strange situation results: the voters struggle with their problems, while their elected representatives sit there twiddling their thumbs during office hours. Why is this happening?

"Of all the deputies I have met, only A. Zborovskiy and a few others are familiar with the needs of their constituents and try to do something for people. The remainder are astoundingly passive. With the help of the executive committees I was able to determine the zones of responsibility of each deputy and to pinpoint the most serious problem areas. I have forwarded the results of my investigation to the organizations which nominated the 'nonworking' deputies, so that they can either recall them or help them step up their activities. This is the immediate task, so to speak, but in the longer-term

future, as already stated, we must concern ourselves with selecting and preparing worthy candidates for deputy to local soviets. I have considered in the past and still consider the issue of local authority to be a paramount problem.

"In addition, contact and communication with my constituents is for me a genuine wellspring of new ideas, assessments, and practical wisdom. Finally, I find it simply a source of a great wealth of sometimes unique information which cannot be obtained elsewhere, as well as strong impressions which touch one's heart.

"Here is a simple example. I was meeting with people active in cultural affairs. The meeting was being held at the Museum of Fine Arts. The museum is housed in the building of a former... produce store. I was shown a modest exhibit as well as storerooms in which Soviet and world art masterpieces were literally piled into a heap due to lack of room. How can one treat national treasures so barbarically?

"Soon after that I visited several establishments occupying quarters suitable for the museum, including the Potrebovyuz building. Within the 30 minutes it took me to reach the executive committee, the consumer cooperative people were screaming all over town that Pylin was acting arbitrarily, planning to evict them, etc. I was forced to remind the comrades about a deputy's authorities and about the liability of officials for slander and attempts to exert pressure.

"But that is just a routine incident. What concerns me is the underlying situation: as long as the subject of discussion is our common business, nobody raises a ruckus. But as soon as a bureaucrat feels that scrutiny is being directed toward him, he is ready to rant and rave. If only this energy could be put to a useful purpose!"

It is quite natural that a deputy must devote a large part of his time and energies to handling problems dealing with the country as a whole as well as municipal matters. Nevertheless in the course of get-togethers with constituents, matters pertaining to Armed Forces daily life and activities sometimes come up.

"Almost every time," stated Boris Filippovich, continuing our conversation. "There is a great deal of interest in the Army and Air Force. Unfortunately, however, many people, influenced by rumors and tendentious articles and TV programs, have formed an incorrect notion of the state of affairs and the reasons for negative phenomena in the military. It is too bad that officers are most frequently blamed for all problems. Persuasion must be used to get people to change their opinions. I try to do this with simple, easily-understandable examples, drawing all those present into the conversation and neutralizing the arguments put forth by the demagogues.

"At one meeting, for example, an attempt was made to draw me into a debate on deficiencies in indoctrination work with military personnel. I asked one of the women

to picture the following scenario: while waiting at a bus stop one evening, you are accosted by hooligans. There are two groups of young people nearby: a group of civilian youths with guitars, and a group of soldiers. From which group are you going to seek help? She replied: 'The military personnel, of course.' Why? Because they are more responsible and possess nobler characteristics. It seems that command personnel in fact do have the ability to educate their men.

"What is my point? In defending the prestige and reputation of the military it is important to engage people in direct discussion. We are clearly deficient in this area. Unquestionably the main thing is not to give cause to bad-mouth military service and procedure in the military.

"I also feel that we need a table of organization structure which would enable combat units and subunits to engage exclusively in combat training, transferring all house-keeping and other secondary concerns to support services. Wherever possible, there should be more extensive incorporation of modern forms of organization of labor, lease-type relationships, and elements of cooperative endeavor.

"Of course my platform is not rigidly dogmatic. I am hoping that collective advice, experience, and inquiry on the part of deputies and constituents will help find optimal approaches and ways to solve problems of further development and strengthening of the Armed Forces and military aviation."

...I do not know and I am not about to guess how fully and quickly the deputy from Kacha will succeed in implementing his plans. A great deal is determined by other forces. Even today Lt Col B. Pylin's businesslike activeness and ebullient energy alarm contemporary Famusovs and frighten Molchalins. Public self-awareness is awakening only very slowly, and unfortunately this also applies to some Air Force units and subunits. Boris Filippovich emphasized in his conversation with me that what he and other people's deputies need today are not words but actual support by deeds. At present, however, the political and practical activeness of Air Force personnel leaves much to be desired.

Nevertheless I feel that it is remarkable that perestroika has lifted such individuals as Boris Filippovich Pylin to the crest of the wave of political and governmental activity. They are seeking to persuade not with words but by their deeds in the past and present, by force of moral example in the struggle for the triumph of the ideals of good and justice, that there is no alternative to perestroika and that changes must be made!

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IL-76 Candids Accomplish Precision Combat Airdrop

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[Article, published under the heading "From Party-Political Work Experience," by Gds Col O. Sivukhin: "Zero Error"]

[Text] The lead element of Il-76 transports reached the objective area.

"Ten from drop point, opening doors," the navigator warned Gds Lt Col V. Takki. This was followed by the warning: "Two minutes to drop."

The aircraft was on its final heading to drop point. All crew members were tense. They were about to drop combat equipment. This was the most difficult and critical phase of the flight. It is for good reason that just prior to taking off on a combat assault delivery mission, military transport aviation aircrews are wished a successful drop. Not happy landings, as customary, but a successful drop.

"Go!" ordered the navigator, Gds Lt Col V. Ignatyev.

The night sky filled with white canopies as the multiple-canopy parachute systems deployed.

"All platforms away," the crew chief in charge of airdrop equipment reported to the pilot.

The pilot turned the now lighter and more responsive Ilyushin to the return heading.

In the drop zone the umpire from higher headquarters noted with satisfaction the high accuracy of the drop: "Outstanding job. Zero error. Who is the element leader?"

"Lieutenant Colonel Takki, the regimental deputy commander for political affairs," replied Gds Col V. Romaykin, who was standing next to the umpire.

"Well, a good beginning. Let's see how the others do."

The aircrews did not let them down. The mock combat mission in support of airborne subunits was accomplished precisely in conformity with the exercise plan and schedule.

Of course the political worker's personal example in the air played a mobilizing role. Nevertheless this was only a small part of the considerable job done by Gds Lt Col V. Takki and by the regiment's commanders, political workers, party and Komsomol activists, and support units on the eve of and during the tactical air exercise, conducted jointly with airborne troops.

After being briefed by the regiment's ranking personnel on the forthcoming exercise, Vladimir Leonidovich carefully analyzed its substance and content, the end objective, the place and role of Air Force personnel in the complex chain of combat coordination. It was important clearly to understand and to create a clear understanding on the part of each pilot and all Air Force specialist personnel on how success or failure by the regiment's aircrews assigned to the tactical air exercise would affect the operational and tactical situation in the area of operations.

Examining possible variations of development of events, the deputy commander for political affairs took into consideration the fact that the conditions in which the transport aircrews would be operating would determine in large measure people's attitude, their modes and methods of accomplishing their assigned missions, and therefore the content, forms and methods of party-political work.

Having arranged for personnel to be given a political briefing on the forthcoming tactical air exercise, Gds Lt Col V. Takki and party committee secretary Gds Maj A. Budinskiy proceeded to draw up a plan. They thoroughly thought out all matters pertaining to selection and placement of party and Komsomol activists, organization of their activities, and ideological support of the men's activities. The plan consisted of two sections: party-political work during the period of preparation and during the exercise. Both sections included measures encompassing all airbase units and specifically the air transport regiment, as well as measures conducted at the squadron, detachment, and aircrew level. Jumping somewhat ahead, I shall state that the plan specificity being sought by Guards Lieutenant Colonel Takki made it possible, within the fast-paced, dynamic environment of a tactical air exercise, to conduct party political work continuously and purposefully, without leaving out a single individual.

Aggressive organizational and political activity by the most experienced, respected Communists, recommended by the party committee and party organizations of the regimental and subunit command elements for the most critical areas of preparatory and basic work, also helped accomplish the end result.

In addition to overall supervision over the system of party-political support for the tactical air exercise, Vladimir Leonidovich took upon himself the job of giving practical assistance to the 2nd Squadron's deputy commander for political affairs, party and Komsomol organization secretaries in mobilizing the men for high-quality preparation and successful accomplishment of the exercise missions. The fact is that, according to the allotment of operational assignments, Lieutenant Colonel Takki was made element leader for this subunit's aircrews. Preparing for the exercise together with squadron personnel, he considered it his duty to exercise political leadership and conduct indoctrination in addition to his command function.

The party committee secretary, Military Navigator 1st Class Gds Maj A. Budinskiy, and party committee member Regimental Navigation Officer Gds Maj A. Ulukhanyants, who would be flying the mission as a member of the 1st Squadron's air element, proceeded according to the same principle.

Unit propaganda officer Gds Maj A. Sinyavskiy, assisted by the activists, did a great deal of work to augment the Air Force personnel political training plans and on conduct of agitation and propaganda activities in connection with the exercise. The activities of lecturers, political briefing officers, agitators, and wall newspaper staffs were focused during this period on the task of all-out activation of the human factor. The unit Komsomol committee, headed by committee secretary Gds Sr Lt A. Artemenkov, and the club council, of which Gds Capt N. Prosurin is a member, worked toward the same ends with their own forms of influence on personnel.

Virtually all members of the party committee, Komsomol committee, and party bureaus of regimental headquarters and the subunit command elements performed specific assignments and tasks, which also helped broaden the sphere of party influence on personnel and the end results of their military labor. Well thought-out placement of activists corresponded to the specific features of the mission assigned to the aircrews and made it possible to do a good job of correcting bottlenecks and to obtain objective party information literally about everything taking place in the air and on the ground.

Requiring an effective contribution by political workers, party and Komsomol activists toward preparation for and conduct of the exercise, Gds Lt Col V. Takki was also pursuing another objective as well. He felt that it was important to enable the regimental commander and his deputies, staff officers, and the squadron and detachment commanders to concentrate their main attention on handling organizational and technical matters. The political worker held a short briefing meeting with leader-Communists of the regiment, support units and subunits.

While totally involved in concerns connected with the conduct of party-political work and with preparing his own crew and the element for the airdrop operation, Vladimir Leonidovich did not forget for a single instant that the aircraft commanders would be the main players at the exercise. Maximum attention should be devoted to these personnel, as well as assistance wherever necessary.

The regimental political officer met and talked with almost all of them. He also met with the crew of Gds Capt S. Shabanov. Sergey had only recently been promoted to aircraft commander. He was a knowledgeable, capable pilot, but he was a bit short on experience in working with others. For this reason at the beginning conflict situations arose in his crew.

As he resolved these conflict situations, Guards Lieutenant Colonel Takki at the same time taught Shabanov the art of skilled combining of the principles of one-man command with the generally-accepted principles of military comradeship and socialist intercourse. Talking with the aircraft commander and his men in preparation for the exercise, the political worker noted with satisfaction that the men were in complete unanimity in assessing their professional and moral-psychological readiness for the exercise, and that the overall attitude was focused on success.

A great deal of individual work was also done with the aircraft commanders who were taking part in such an exercise for the first time: Gds Capts A. Shavyrin and V. Bepalov. Party member Gds Lt Col V. Ignatyev worked with the navigators. Briefing the political worker on progress in preparing his subordinates, he assured Vladimir Leonidovich: "I can vouch for every one of them. They will not let us down!" An equal degree of confidence was expressed by Gds Lt Col A. Tokarchuk, Gds Majs Ye. Yefimov and V. Petukhov, Gds Capts G. Basharin, R. Lepsoo, and L. Stepanov, as well as other party members who were working with aviation engineer service personnel.

...The guards military transport aviation regiment aircrews, roused in the middle of the night by an alert signaling commencement of the exercise, soon landed at an unfamiliar airfield, at which airborne troops were waiting for them.

Not losing a single moment of precious time, aircraft crews and airborne personnel proceeded to load combat equipment aboard. Having organized loading operations on his aircraft, Gds Lt Col V. Takki left his copilot to supervise and hurried over to where his element's Ilyushins were being loaded. The political officer briefly spoke with the aircraft commanders and aircrew party group organizers and recommended that they focus the men on thorough preparation and flawless performance during the drop.

A high degree of organization, discipline, and a responsible attitude on the part of aircrews and airborne personnel toward the job at hand made it possible to accomplish aircrew final preparations quickly and fully, taking into account changes in the operational and tactical situation as well as changes in weather conditions in the objective area.

Back aboard his own aircraft and ready for departure, Vladimir Leonidovich mentally analyzed the results of the completed phases of the exercise: the flight to the troop pickup field and the loading of airborne troops and equipment had been accomplished without adverse comment, with an almost 30 percent improvement on the standard time for performing these procedures. They had been able to create this reserve potential entirely through activation of the human factor. This conclusion pleased the political worker most of all. The work put in by him, his subordinates, and by party and Komsomol

activists to establish an effective system of party influence had ensured a genuine return on effort, which inspired confidence that the assault airdrop and final phase of the tactical air exercise—return of the aircraft to their home base—would be successfully accomplished.

And that is the way it went. Zero error in the equipment drop and flawless execution of the other elements of the mission convincingly attested to the fact that the regiment's commanders, political workers, party and Komsomol organizations had succeeded in the course of preparing for and carrying out the exercises in welding together a high degree of combat skill and will to win in the men of this guards unit.

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Reader Suggests Improvements in Structure of AF Sociological Services

90R10001J Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 8, Aug 89 (signed to press 5 Jul 89) p 18

[Article, published under the heading "The Reader Continues the Discussion," by Ye. Ignatyeva, research consultant psychologist, psychological aptitude screening group, Irkutsk Higher Military Aviation Engineering School: "Don't Ruin a Good Idea"]

[Text] An article by Maj Gen Avn A. Bystrov entitled "Democratization of Command, Control, and Management: Ways and Methods" (AVIATSIYA I KOSMONAVTIKA, No 1, 1989) addresses very important problems of style and methods of command, control, and management activity in the military. There is no need to argue the fact that these problems must be resolved. This is required by the objective course of development of our Armed Forces. And this must be accomplished in short order, utilizing our entire scientific potential.

The article's author notes the importance of sociopsychological research in the area of administrative and management activity, pointing out in particular that Air Force higher educational institutions currently have qualified specialists to conduct such studies: political workers, social sciences instructors, and psychological aptitude screening group staff personnel. This is certainly true, but there also exist certain problems. I should like to discuss these problems.

The personnel issue will indeed be the determining issue at the initial stage of organization of sociological services. At the present time there is perhaps no other area of endeavor where success would depend to a determining degree on confidence in those persons conducting studies and surveys. We should note the high degree of professional competence which such specialists should possess, not to mention purely human qualities.

Sociology and social psychology are separate, independent disciplines, with their own specific features and methodologies. Persons conducting research work must be aware of this fact. Unfortunately, experience indicates

that many political workers and social sciences instructors who have the ability to work with others are not capable of performing the role of specialist-sociologist. The danger arises that amateurs, even if proceeding from the finest motivations, could ruin the very best idea and discredit a specialization area and the people with expertise in that field.

One should determine the status of social-psychological services specialists. As a rule establishment of these services begins with the addition of one or two sociologist-psychologists to a subunit staff, such as personnel section, training section, or scientific research section. Thus in my opinion a mistake is made right at the outset. The independence of the sociological services is infringed. As part of the personnel section staff, for example, these specialists are used only for handling personnel matters, while those in the training section are used for matters of organization and support of the training process. And yet their job should be to address the broader spectrum of social problems facing military units. For this reason they should function not as staff personnel of specific subunits but rather autonomously and not subordinated to them.

Necessary organizations have already been established to resolve this matter. There exist, for example, at Air Force schools psychological aptitude screening groups within the personnel section. If they were made independent subunits and beefed up with two staff members (a specialist in sociology or social psychology and a technical support person in typing and office procedures), this service could perform not only work in the area of career counseling and aptitude screening, but could also conduct current sociological studies for the command authorities.

Sociological services operate only when there exists a social imperative for their functioning and support by higher authorities with an interest in adopting the recommendations of science. The psychological aptitude screening group at the Irkutsk Higher Military Aviation Engineering School is operating in ideal conditions in this respect: the school's commanding officer, Maj Gen Avn B. Rozhkov, always keeps current on both our research and the current work we are doing, and he is interested in seeing its successful completion and the adoption of finished proposals.

As is indicated by the experience of our psychological aptitude screening activities, mandatory for successful activities by sociological services is constant contact with political sections, party committees, trade union and Komsomol organizations, which are called upon to lead people, taking their opinions and attitudes into account. We are talking about a relationship grounded not on subordination to the political section, as the author of the article suggests, but rather on equal-basis collaboration.

Today there is an urgent need to establish an effective scientific methods center, the task of which would be to

direct specific sociological studies on a national scale, providing scientific, methodological, mathematical, and other support to these projects. It is high time to work out a system of advanced training for the personnel of sociological services within the framework of presently-existing institutes, also enlisting the services of Soviet Army civilian employee specialist personnel, for the system of advanced training for Air Force higher educational institution specialist personnel at present lacks an advanced training course of study for psychological aptitude screening group research consultant-psychologists. But there is a need for this.

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Unit Commanders' Independence Cramped

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[Article, published under the heading "The Reader Continues the Discussion," by Capt S. Prokopenko: "The Order Has Already Been Signed!"]

[Text] When a company commander slot opened up in the airfield technical support battalion, Sr Lt A. Smetanin's colleagues hastened to congratulate him: Get ready to take over, they said. This showed recognition by the men in his unit of this officer's professional and command qualities as well as the hope that he would be able to pull the subunit out of the dead end into which his predecessor had put it. Many assumed, and with reason, that a better candidate could not be found. Smetanin was an officer of volition, was knowledgeable, and had the ability to work with others. And his platoon had been rated excellent over the course of several training periods.

The call from higher headquarters came like a bolt out of the blue: "We have found you a company commander. He will be arriving soon...."

"But we have our own man....," the battalion commander replied, but he was not given a chance to finish: "The order has already been signed!"

The battalion commander later recalled this conversation time and again, reproaching himself for his indecision and for being unable to stand his ground. But what could he do, since he had been faced with a fait accompli? Of course he could have argued and debated the point. As a military man, however, who had devoted more than half of his life to military service, he was accustomed to submitting to orders. There was also another minor point. Not long before this it had been hinted to the battalion commander that he had a chance of being transferred to a "less hectic" position. The fact is that Viktor Stepanovich had no wish to irritate his superiors. But whenever he happened to see Smetanin he felt some embarrassment and guilt. The latter probably understood, however, that the battalion commander was

not omnipotent. In addition, all this happened at a time when it was not yet the practice extensively to discuss candidacies for promotion.

The new company commander gave the impression of being an energetic, assertive individual. He appeared to be well suited to the job. As time passed, however, no changes for the better occurred in the subunit. They decided to help the new company commander and began devoting greater attention to the lagging subunit. The officer's reaction was unexpected: he began explaining away deficiencies in his performance as being caused by a lack of adequate independence and excessively close supervision. Here too they tried to accommodate him. But it was subsequently ascertained that he was doing this only in order to avoid having his actions monitored and to conceal his mistakes, and in certain instances his incompetence. He would explain this away as being due to deficiencies in his subordinates, while he would claim full and exclusive credit for even the slightest success. Dissatisfaction within his unit grew, and an unhealthy atmosphere developed among the subunit's officers. It was time to take decisive measures. But something else happened: orders came, transferring the company commander to another unit....

One could say that many trends which had been dominant for a long time in selection and placement of personnel are reflected in this story: patronage, voluntarism, and ignoring the opinion of the unit's personnel and commanding officer when determining matters of promotion. Who other than they should be deciding who is to be assigned to what position? But it took us years to arrive at this seemingly simple truth. The roots of this phenomenon must be sought in that time when considerably more Gold Stars appeared than heroes, when positions were filled not on the basis of personal qualities but rather according to personal likings, to the number of services performed by somebody for somebody else, or according to years in service.

I recall another incident. An officer was transferred to our unit. Nobody in the unit knew him, and it was difficult to judge his professional competence. This decision by the personnel people took many of us by surprise. "Somebody's protege," we decided. And our attitude toward the newcomer became cold, suspicious, and at times prejudiced. He was forced to pay a greater price than he deserved for his mistakes, and mistakes are inevitable when one is just breaking in. All this was very unpleasant for the new officer. The fear of making a mistake or saying the wrong thing made him uncommunicative and close-mouthed; he avoided any and all contact with his colleagues. Some misinterpreted this to mean that he was conceited. And once again the whispers and rumors began....

Glasnost, openness, mandatory consideration of people's opinion—this is the path which will make it possible to avoid such problems in determining personnel matters. The viability of these principles is obvious, but

they are not always applied. The machine of administrative bureaucracy continues to operate.

All our activities are governed by military regulations and basic directives. But also circulating in addition to these are a great many instructions which at times oddly combine an administrative-dictate and contemptuous attitude on the part of the administrative apparatus toward the executing personnel. Senseless directives destroy respect for all "papers from above." And who knows at which end a flippantly casual attitude is worse—on the part of those for whom these instructions are intended or those who produce them, forgetting about the people standing behind them.

There is an order, for example, which states that pilots returning to the unit following duty in the Republic of Afghanistan shall occupy the positions they held prior to their tour of duty in Afghanistan. It is hard to say what reasoning was being used up the chain of command, but the consequences are paradoxical. Those who by virtue of their sweat and sometimes blood as well earned the right to command flights and serve as detachment deputy commanders returned to their unit as senior pilots. And considerable time would pass before their names would be entered into that next-higher box. The result was that the right to command, which had been earned in battle, had to be defended by performance in the landing pattern. It also sometimes happens that aircrews and flights which have developed smoothly-oiled coordination with one another are reshuffled without the consent of the squadron commander.

I do not believe there is any need to argue the point that this kind of shuffling of assignment slots imposed from above does great damage to subunit combat readiness and deprives commanders of independence. And yet many such orders, instructions and regulations, as well as the work style which logically proceeds from them, are still in effect.

I shall cite an example. In one of the subunits it was learned that a deputy commander slot would soon be open. The commanding officer, gathering together those who in his opinion were worthy of promotion, proposed to them something in the order of competition for the slot. This was a powerful incentive, and the officers made every effort to earn the right to the promotion. Things happened differently, however. At higher headquarters they found another candidate. I am not doubting his virtues or professional qualities, but a rather ticklish situation developed. We do not yet know how it will be resolved. On one side of the scale is the commanding officer's authority and his right to independence in conditions of expanding democratization of life in the military, while on the other side there is the persisting prerogative of higher headquarters to determine personnel matters. I feel that selection of candidates for promotion is a key issue in the restructuring of personnel policy. Right now there is a great deal being said to the effect that we cannot get very far without commanders of inquiring mind, with initiative and

competence, capable of independently reaching and implementing important decisions. One of the steps along this road will be giving an officer the right to decide for himself who should be appointed to what position. Until the question of "who can see things more clearly?" is resolved in his favor, those persons who have someone looking after their interests will continue migrating from battalion to regiment, from regiment to division, from district to district.

Why am I writing about all this? After all, no magazine articles can root out the system of patronage in society as a whole and in the military in particular. But at some time we must rid ourselves of this slave psychology. How long can all this whispering in smoking lounges go on? Glasnost alone can help us correct those problems which have been festering for decades.

Incidentally, there has been some movement. At a combined unit party activists meeting, for example, the proposal was made to establish a commanders council, which would assist the command authorities in settling matters connected with promotion. The idea was approved unanimously. Will it be implemented?

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Military Transport Aviation Cooperates With Aeroflot in Helping Civilian Sector

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[Article, published under the heading "Following a Policy of Perestroyka," by Mar Avn A. Volkov, USSR Minister of Civil Aviation: "Strategy of Teamwork and Cooperation"]

[Text] More extensive utilization of military transport aviation aircraft will make it possible to free from certain specific hauls many Aeroflot subdivisions, which in turn will be able more fully to meet the needs of this country's people, particularly the most remote and inaccessible areas in Siberia, the Far North, and Far East.... For this is one of the principal duties of civil aviation.

* * *

Since those early, distant years when military and civilian aviators were just commencing joint actions in the interests of the homeland, the destiny of winged brothers has bound them firmly together. When one gives thought to this sacred concept, one always recalls the years of struggle for Soviet rule, filled with the heroic exploits of the Krasvovenlety [Red Military Pilots—title used in early years of Soviet regime], and the flaming years of the Great Patriotic War, during which the fighting bond between the Air Force and the Civil Air Fleet became perhaps its strongest, as well as many other landmarks in our history.

Yes, the annals of Soviet aviation record a great many brilliant instances of close alliance and cooperation between military and civilian pilots. The traditions laid down during those harsh years live on and continue to develop today. They were vividly manifested during performance of one's internationalist duty in Afghanistan, when Military Transport Aviation and Aeroflot crews airlifted food and medical supplies, equipment and building materials, specialists and consultants to the brother republic. It is a well-known fact that many of those flights, humane in their very essence, involved risk to the lives of the aircrews, but no aviator declined to fly those runs.

The disaster which occurred at the Chernobyl nuclear power generating plant in May 1986 left deep and lasting pain in the heart of every Soviet citizen. Once again Air Force and Aeroflot pilots worked hand in hand, shoulder to shoulder, as in a combat environment. Very quickly essential equipment and specialist personnel were airlifted to the disaster site. And helicopter pilots, both military and civilian, performed the most hazardous and, I would say, jeweler's precision job of "subduing" the damaged reactor unit and performing radiological decontamination in the disaster area. The aircrews were fully aware that they were risking their health but, just as during the war years, they displayed great courage.

The recent tragic events in Armenia required that emergency assistance be rendered. Within a brief instant an earthquake of unprecedented destructive force took thousands of human lives and caused enormous physical damage. Almost 514,000 persons were made homeless. The earthquake totally demolished or seriously damaged dozens of industrial enterprises, severed rail lines and highways, ruptured bridges, cut communications lines, and totally knocked out utilities and services on many kolkhozes and sovkhozes.

Immediately following the earthquake dozens of Military Transport Aviation and Aeroflot fixed-wing and rotary-wing aircraft took off for the Yerevan and Leninakan airports: from Georgia and Azerbaijan, from Moscow and Tyumen, from Sochi and Nalchik, from Makhachkala and Ashkhabad.... Within the first 24 hours aircrews flew a vast number of runs to the disaster area. They delivered 700 medical personnel and rescue workers and evacuated 2,500 seriously-injured victims. A headquarters to coordinate assistance to the earthquake victims was immediately set up at the Ministry of Civil Aviation. It closely monitored organization of rescue and relief activities, taking prompt action as needed.

Deputy ministers of civil aviation M. Timofeyev, O. Smirnov, and Yu. Yurkin, as well as experienced ministry specialist personnel were dispatched to the earthquake area. Airlifted assistance also was coming from many foreign countries. More than 150 foreign aircraft were landing at Yerevan's Zvartnots Airport every 24 hours. They came from Frankfurt/Main, London, Washington, Stockholm, Sofia, Berlin, Paris, Belgrade, and

other cities throughout the world. Leninakan Airport would normally handle five or six arrivals daily, but after the earthquake it was handling as many as 100 landings a day. They were bringing clothing, tents, medical supplies, heaters and other supplies which were essential to the earthquake victims in this emergency situation.

During those tragic days military and civilian aviators once again demonstrated cohesiveness, complete mutual understanding, selflessness, and a high degree of professional expertise. The brotherhood which was born in battles for the homeland was now manifested in the struggle against the consequences of the earthquake. As was stressed in a PRAVDA interview by USSR Minister of Defense Army Gen D. T. Yazov, candidate member of the CPSU Central Committee Politburo, more than 350 Military Transport Aviation aircraft were mobilized to assist the earthquake victims. A total of 32,400 tons of supplies and equipment, including 377 cranes, 98 excavators, and 1,320 tons of food supplies were flown into the disaster areas within just 20 days or so following the earthquake. Even such extremely heavy equipment as 74-ton truck-mounted cranes were flown to Yerevan by An-124 Ruslan heavy-lift aircraft.

As the result of our common efforts, we succeeded in rendering emergency medical aid to victims literally within hours, and in reaching additional victims on the following days. With extensive recovery efforts presently in progress in quake-devastated Armenia, an intensive airlift to Yerevan and Leninakan is still in progress. Aircraft bearing red stars on their wings and blue Aeroflot emblems on their fuselage are landing daily at Armenia's airports, delivering badly-needed supplies and equipment. The cooperative effort between military and civilian aviators is continuing.

Perhaps the story of this cooperation would be incomplete if we mentioned only joint operations during the war and emergency situations, when catastrophe compels the entire world to lend a hand. We have presently entered a qualitatively new phase of cooperation which is dictated by totally different tasks. The fact is that in the course of implementing today's defensive Soviet military doctrine and applying new approaches to issues of defense organizational development, a realistic possibility has developed to convert a substantial portion of Military Transport Aviation over to serving the needs of our nation's economy. Or, to put it in other words, to convert part of our military potential over to resolving socioeconomic problems. This statement of the matter is fully in conformity with the course of policy stated at the 27th CPSU Congress and 19th All-Union Party Conference; it was thoroughly discussed in the course of debates at our party's March (1989) Central Committee Plenum.

Some people question whether there is a need, under ordinary conditions, to enlist the resources of Military Transport Aviation in the service of our economy. Has Aeroflot, which is rightly considered to be the world's largest airline, begun to lose ground, and has it become unable to carry out its assigned tasks? I can give an

unequivocal reply to this question. Year after year Aeroflot has been increasing its volume of passenger, mail and cargo service. Last year, for example, it carried more than 120 million passengers and hauled more than 3.5 million tons of urgently-needed cargo and mail. During the busy summer season our country's airports are handling approximately 600,000 persons each day. Nevertheless we are unable fully to meet air transportation demand.

In the estimate of experts, approximately 15-20 million persons each year walk away from Aeroflot ticket counters empty-handed and unhappy, as they say. If to this we add priority fruit and vegetable runs to destinations in the Far North, which also frequently become a stumbling block to us, one can see how important assistance by military aviators is.

What kind of cargo hauls will Military Transport Aviation undertake? This would be determined primarily by the structure of the military air transport fleet. Such giant aircraft as the An-124 Ruslan and the An-22 Antaeus, for example, neither of which, incidentally, has yet been added to the Aeroflot fleet, can be used to haul large-sized structures, earthmoving equipment, cranes, etc to construction sites in Siberia or the Far North. Incidentally, the crews of these heavy-lifter aircraft have had experience in this kind of haul. They have been enlisted in the past to perform service for oil exploration drilling crews, oil and gas producers, and in pipeline construction. They have always successfully handled such tasks. I am confident that their skill and knowledge will continue in the future meeting the expectations of the people they serve.

Other military aircraft, the Il-76 and An-12, can be adapted to haul agricultural produce. We should emphasize that these aircraft are widely used by Aeroflot as well. Every day they fly dozens of runs to Vorkuta, Pechora, Norilsk, Amderma, Magadan, Surgut, Khatanga, Tiksi, Yakutsk, Anadyr, and other towns in the North. Over the course of a hauling season more than 40,000 tons of "vitamin product" is hauled north from our southern regions. Thanks to these efforts the workers in the Arctic and remote Far Eastern regions receive fresh fruits and vegetables practically at the same time as Muscovites, Leningraders, and other people in our country's central regions.

Nevertheless Aeroflot is presently unable fully to accomplish this task. Contributing factors include a shortage of fuel, aircraft, and aircraft engines. Agricultural hauling requirements for this year, for example, total 65,000 tons, but our capabilities remain at 40,000 tons. Military Transport Aviation aircrews will make up the 25,000-ton difference. More extensive utilization of Military Transport Aviation aircraft will make it possible to free many Aeroflot subdivisions from certain specific hauls; these subdivisions in turn will be able more fully to meet the needs of the Soviet public, particularly in the most

hard-to-reach and remote areas of Siberia, the Far North, and Far East, for this is one of the most important jobs of Civil Aviation.

Thus there are plenty of points at which our military colleagues can apply their efforts. All these areas are of enormous economic and social significance and are perceived by Aeroflot personnel as a large contribution toward our people's common cause. Of course a number of organizational, legal, financial and other matters arise thereby, without which it is impossible to ensure a precision, smoothly-running operation by our joint air transportation effort. In particular, we must thoroughly adopt a system of direct contracts with enterprises and organizations which would use the services of Military Transport Aviation. Certain differences may arise as regards rate policy, although logically rate policy should be applied according to the same principles as are applied by Aeroflot. We must also eliminate any and all delays at civil aviation airports in servicing military aircraft, for virtually all fruit and vegetable hauls involve Aeroflot airfields, and it is very important at these airfields not to divide aircraft into the categories of ours and somebody else's; all aircraft must be given equal attention and service, with a high degree of responsibility to the national interest. The Ministry of Defense in turn must transfer over aviation fuel supplies to civil aviation in a prompt and timely manner, so that it can be used to fuel Military Transport Aviation aircraft at civil aviation fields.

In our opinion all these problems are fully resolvable. We must not rest on our laurels, but constantly seek new ways and means to make further advance forward and to improve our collaborative effort.

Incidentally, a formal agreement between the Air Force and the Ministry of Civil Aviation to establish an Interministerial Flying Methods Council, directed toward improving the professional skills of flight personnel, synthesis of advanced flying know-how, and coordination of interministerial flight safety efforts, constitutes a specific manifestation of this effort.

Establishment of such a council is dictated by the present level of development of aircraft equipment and the constantly increasing scale of aircraft utilization, whereby any problems in methodological or other types of flight operations support can cost dearly. Aeroflot has appointed the following to this council: M. Tereshchenko, chief of the ministry's Main Flight Service Administration; N. Nikulin, head of the Leningrad Civil Aviation Academy; M. Rubets and A. Yakovlev, heads of the Kirovograd and Aktyubinsk higher flight schools; V. Gerasimov, head of the State Scientific Research Institute of Civil Aviation's flight test facility, as well as other prominent aviation experts.

We hope that these initial steps toward uniting our efforts will be followed by others, which will raise cooperation between military and civilian aviators to a higher level. This cooperation should bear important

socioeconomic fruit. We must consolidate it and develop it further. This is demanded by our common interests. This is dictated by perestroika, which has encompassed all aspects of life and development of Soviet society, including the aviation domain.

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Combat Information Diagram

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[Annotated diagram: "Combat Information"]

[Text] Effectiveness of conduct of combat operations depends in large measure on availability of the most diversified information. Of importance thereby is optimization of the information flow required for efficient, reliable functioning of the tactical command and control or battle management system. The volume, content and detailing of data presented by each individual should be strictly in conformity with their duties, place and role in the overall system.

An excessive amount of information, just as an insufficient amount, makes situation evaluation difficult. In this connection it is necessary to organize in a prompt and timely manner the collection only of that data which is relevant to and supports comprehensive situation analysis and reaching a well-substantiated combat decision.

The following classification of information is one possible variation and should prompt discussion, debate, and innovative inquiry on the part of military aviation personnel.

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Energiya Launch Vehicle Monitoring and Control Systems Described

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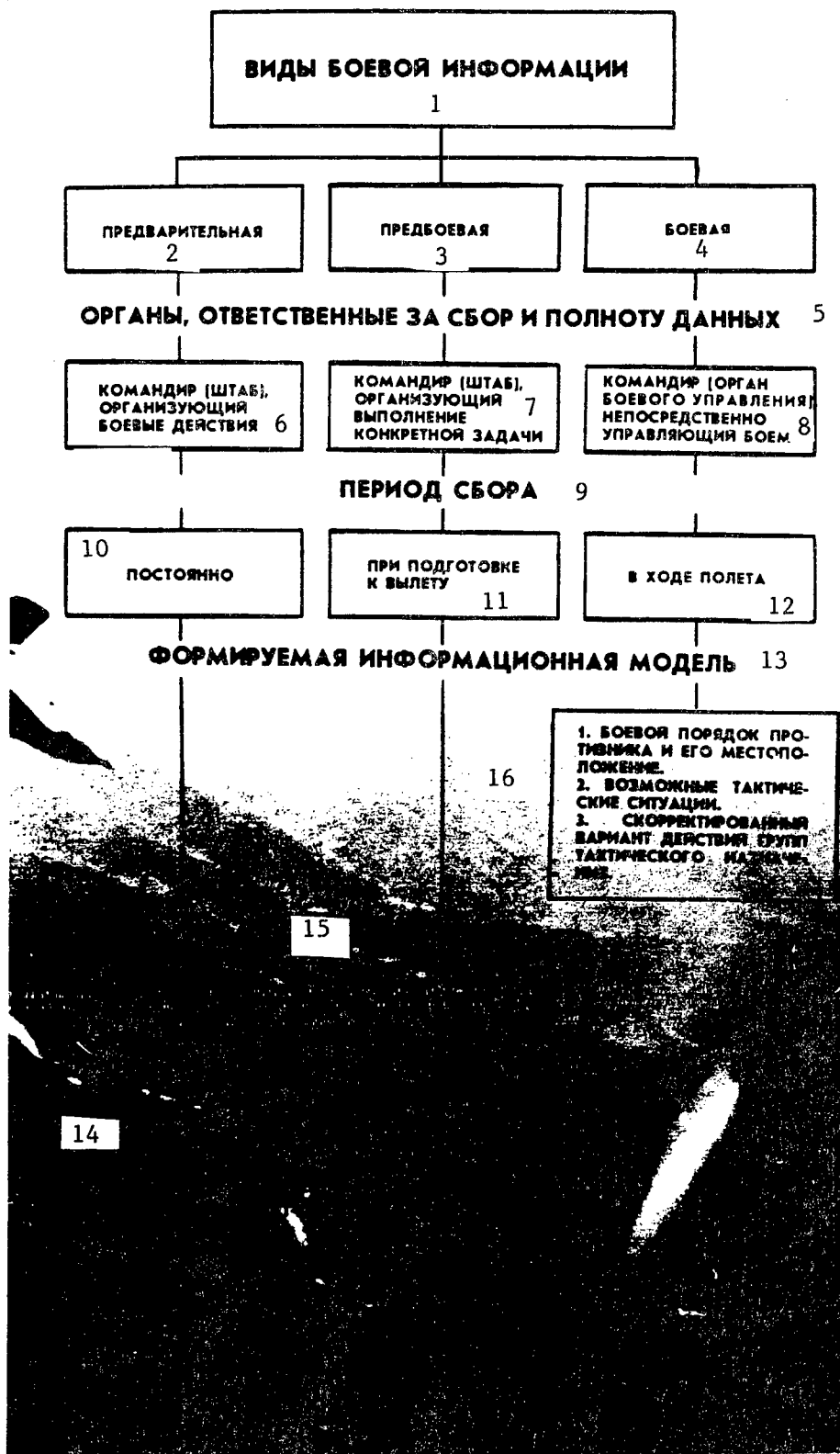
[Article, published under the heading "Space Flight Support," by Candidate of Technical Sciences P. Kulish: "Energiya Monitoring and Control Systems"]

[Text] The flight of such a technically complex system as the Energiya launch vehicle is inconceivable without accurate, rapid-response, and reliable monitoring and control systems. And the fact is that when it is erected for launch it is connected by thousands of electrical and dozens of compressed-gas and hydraulic "threads" to ground equipment. The automatic launch countdown sequencing system (ASUPP) operates in continuous mode, coordinating the operation of all ground and onboard systems. Several hundred onboard centralized parameters monitoring system sensors check temperature and pressure at various points on the launch vehicle, in its various compartments, bays, and tanks and, using ground equipment, maintain these parameters within the desired ranges.

Prior to commencing fueling of the rocket with the liquid-propellant components, the fire and explosion warning system (SPVP) switches on. This system, in spite of the many design features which enable us to eliminate the possibility of leaking of propellant components, is designed to respond in so-called abnormal or emergency situations and to ensure safety against the possible forming of explosive mixtures in the launch vehicle's interior spaces. The system includes several dozen highly-sensitive and accurate gas analyzers, which

Key:

1. Types of combat information
2. Preliminary
3. Precombat
4. Combat
5. Agencies responsible for collection and completeness of data
6. Commander (staff) organizing for combat operations
7. Commander (staff) organizing execution of specific mission
8. Commander (tactical command and control agency) directly exercising tactical command and control
9. Period of collection
10. Continuously
11. During mission preparation
12. During the mission
13. Information model formed
14. 1—general situation in tactical area of operations; 2—status of combat situation and anticipated influence of combat situation elements and factors; 3—combat capabilities of countermeasures assets; 4—nature of actions and tactics of enemy air assets
15. 1—probable situation in objective area; 2—nature of hostile countermeasures; 3—principal variations of impending actions; 4—alternate variations of impending actions
16. 1—disposition and location of enemy forces; 2—possible tactical situations; 3—adjusted variation of actions by tactical elements



respond to hydrogen, oxygen, and kerosene fumes, as well as fire warning devices, which respond to hydrogen flame. The information obtained from these sensors is processed and analyzed by a specialized digital computer system (TsVK). The onset of a fire or explosion hazard situation causes a suppressive response by the onboard and ground equipment of the SPVP, which feeds nitrogen gas into the warning-indicated spaces and, if necessary, a highly-effective extinguishing material as well.

The fueling monitoring system switches on just before launch vehicle fueling commences. Specific features of rocket propellant components, such as extremely low temperatures, low specific gravity, as well as high demands regarding accuracy of metering (measurements must not exceed an error of just a few millimeters with tanks measuring up to 30 meters) required designing and building for the Energiya launch vehicle a monitoring system which is unique in its specifications and capabilities. Discrete and continuous capacitive sensors were placed in each tank, providing capability to measure fuel level to the tank's full height. Sensor readings are fed to the ASUPP via ground equipment and are subsequently used to control the fueling process, including synchronization of tank filling. This makes it possible to avoid excessive structural stresses on the launch vehicle.

When fueling is completed, these systems, working jointly with ground systems, regulate right up to launch the average in-tank temperature and level of supercooled fuel components. We should note that during the entire process of prelaunch procedures, launch vehicle and ground systems parameters are recorded and, when necessary, displayed on operator consoles.

An onboard and ground self-contained or autonomous control system (KAU) goes into operation when launch vehicle fueling is completed. This system is capable of fully-automatic prelaunch testing of all launch vehicle onboard equipment, of performing prelaunch procedures, igniting engines and controlling systems and launch vehicle during unassisted flight. Prior to launch updated figures are fed into the KAU computer, figures which slightly refine the previously-loaded launch data: for example, actual fuel temperature and final weather data. After this systems switch to continuous automatic launch vehicle operation mode. The various systems switch on according to the programmed sequence, and execution of KAU commands is monitored.

When a malfunction is detected, and several hundred operations and states are being monitored, an automatic countdown sequence interrupt (APP) command is fed to the ASUPP. The launch countdown sequence is halted, and the KAU returns to the initial state. Depending on when the APP command is given, however, the decision can also be made to repeat the launch countdown procedures sequence, but with time of launch moved forward. If the APP command is triggered after so-called "irreversible" operations (ground power cable and compressed-gas line disconnect, issue of command to ignite

engines, etc), countdown sequence restoration procedures are needed. And in order to ensure safety for performance of these operations, the tanks must be emptied of fuel.

Launch vehicle onboard power supplies are switched on during the launch countdown sequence. The emergency engine protection system commences monitoring when onboard power is switched on. The gyroscopes are brought to launch configuration by a special optoelectronic alignment system. A system to ensure the burning of any remaining hydrogen cuts in just prior to second-stage motor ignition.

The Energiya launch vehicle lifts off. The fueling monitoring system, centralized parameters monitoring system, gyroscope alignment and hydrogen final burn systems have completed their work. The fire and explosion warning system, however, continues to monitor gases in the launch vehicle interior spaces and to check for possible ignition of hydrogen fumes. If the necessity arises, this system is capable of feeding nitrogen gas into the problem compartment.

An emergency protection system safety-monitors first- and second-stage rocket motor operation. This system includes sensors monitoring temperature, pressure, turbopump, rpm and other critical engine parameters, as well as amplifying and boosting equipment and a digital computer system which processes information from the sensors in all eight engines. If the parameters of any engine exceed specified limits, a command is given to shut down the problem engine, thus eliminating the possibility that it will destruct.

Depending on when the malfunctioning engine shuts down, the KAU either continues the flight, using the thrust of the remaining engines, or automatically alters the flight program in conformity with a procedure fed into the computer in advance.

As we know, the self-contained in-flight control system's job is to stabilize the launch vehicle relative to its center of mass and to control its movement along its flight path in order to insert the payload into a predetermined point in space with a specified degree of accuracy. But the complexity and unique design of the new launch vehicle, the fact of a multiengine propulsion system, diversity of payloads, and the need to ensure a high degree of operational reliability dictated the development of a totally different control system both from the standpoint of hardware and computer software. Obviously such a task could be accomplished only by using the latest advances in microelectronics and computer technology. When the launch vehicle is in flight, for example, operating within the KAU alone is an aggregate of five computers, each of which is rated at approximately 1 million operations per second.

In contrast to traditional schemes, during flight the KAU also controls all onboard systems. It distributes electric power among all power users, power obtained from batteries on the first stage and from a turbogenerator on

the second stage, manages fuel consumption and adjusts the operation of all engines, controls the automatic booster stage and payload separation system, switches on, mode-switches, and switches off all associated systems.

The unique nature of the job of controlling the Energiya launch vehicle can be demonstrated, for example, by giving the total number of drives and final control elements in the first and second stage system. They total 56. These are highly-complex, highly-precise, powerful, digital-control electrohydraulic devices. They help adjust fuel consumption in the booster motors and accomplish combustion chamber swiveling.

A special monitoring system is used to monitor and record the operation of all launch vehicle systems during flight as well as environmental parameters in the compartments, and mechanical stress loads on the launch vehicle structure. The system includes several thousand sensors and other devices. Obtained information is transmitted by radio wave to ground telemetry monitoring facilities for subsequent processing and analysis.

Thus the Energiya launch vehicle's monitoring and control systems constitute a highly-complicated automatic complex based on interaction with digital computers. The two Energiya launches have confirmed that Soviet scientists and engineers have accomplished the main task of designing and building such systems and ensuring their reliability. At the same time, in view of the unique nature and cost of payloads and the need to ensure maximum safety of manned missions, efforts to confirm reliability and to reduce weight continue to be the main element in subsequent efforts by the designers and developers of these systems. This will make it possible to increase the effectiveness of launch vehicle utilization. That which has already been developed for Energiya—devices, components, and systems—can also find application in other branches of Soviet industry.

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Maintenance and Aircraft Reliability

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[Article, published under the heading "Problems, Inquiry, Solutions," by Lt Col V. Panasyuk, regimental deputy commander for aviation engineer service: "Figured and Actual Reliability"]

[Text] When people take delivery on what is a new aircraft for them, they ask themselves: what kind of equipment is it, what kind of reliability characteristics does it have, and what must be done to improve them? We too have experienced this. Of course at the initial phase the main thing was to perform scheduled inspection and maintenance procedures precisely according to the requirements of guideline documents, in full and with excellent quality.

New problems would arise, however, as we amassed maintenance experience. Industry, for example, insists on calculations-based reliability characteristics specified by the designers and incorporated in the course of manufacture. But additional factors to consider include operating conditions (we, for example, are located in the Far East), level of aviation engineer support and, finally, nonuniformity of quality characteristics, which cannot be figured in advance. For this reason the following question inevitably arises for aviation engineer service personnel: "How should one resolve the problem of reliability?" Should one use generally-accepted methods or should one seek one's own methods, that is, ensure reliability in general or reliability of specific aircraft?

There is a conflict contained in the very approach to resolving this matter. Aviation engineer service personnel deal chiefly with maintaining specific aircraft at a specified level of reliability. Reliability analysis is performed taking into account aircraft type, according to synthesized methods, which are frequently little applicable under various specific conditions. Without producing a high degree of effectiveness, they increase overall labor outlays on aircraft, since they constitute a supplement to maintenance procedures.

Labor expenditures to maintain a specified degree of reliability with the currently-employed system of scheduled preventive maintenance are growing steadily, especially on second-generation and third-generation aircraft, which provide poor designed-in efficiency of servicing and maintenance and poor ease of inspection. The first reason, as already stated, lies in generalization and synthesis of reliability characteristics. Perhaps this is convenient and makes sense to use on a large scale, but at the unit level this leads to overloading the aviation engineer service with great numbers of little-effective measures, a method of evaluating which, incidentally, is also currently lacking.

At the same time maintenance experience unequivocally attests to the fact that there are no absolutely identical aircraft as far as reliability is concerned, even when you are dealing with aircraft of the same type and model. One flies for years without malfunction, while things are constantly going wrong on another. An aircraft also has its own chronic "ailments," which sometimes can be "healed" neither during the initial warranty period nor in the course of subsequent maintenance. These are deep-seated problems, indicating their presence only by periodic malfunctions.

Another impeding factor is a cavalier attitude toward evaluation and analysis of reliability, which leads to deformation and distortion of reliable materials and to an endeavor to obtain "what is needed" rather than "what actually exists." The necessity and degree of intervention by maintenance personnel into equipment operation in the process of servicing and maintenance is a separate matter altogether. Intervention should be selective and reduced to a minimum, for the conditions

in which maintenance is performed, the degree of equipment of work stations and the skill level of engineer and technician personnel at the unit level are considerably inferior to the degree of equipment and level of qualifications of cadre workers involved in regular aircraft production and even in performing repairs at aircraft overhaul depots. And the more frequently such work is done, the more rapidly aircraft reliability declines.

How can the problem of reliability be resolved at the unit level? The answer is obvious. What is needed is strict consideration of the peculiarities of a specific aircraft and a shifting of scheduled preventive maintenance procedures in the direction of inspection, with maximum elimination of disassembly-assembly operations. We feel that there is merit to our proposed method of revising maintenance procedures on the basis of practical reliability analysis directly at the unit level. The principal source of information would be statistical data on operation and maintenance of combat training aircraft of the same type, aircraft which, performing the function of "leaders," can make it possible to predict the behavior of the entire aircraft fleet under specific conditions, with the existing level of aviation engineer support.

What is the essential substance of the new method? Adopted statistical methods of studying the reliability of aircraft are too complicated to use at the Air Force unit level. They involve an unwieldy mathematical edifice and require large amounts of statistical information in order to obtain reliable results, as well as specialized training for the personnel involved. It is difficult to "attach" them to a specific inventory of military aircraft and, most important, they do not presume selectivity of intervention in equipment operation by maintenance personnel.

The proposed tabular analytical analysis of aircraft reliability has been tested and verified in our unit. It provides capability precisely to differentiate an aircraft fleet and on this basis to alter the structure of labor outlays on ensuring reliability.

In performing analysis, of the entire aggregate of data on aircraft reliability one utilizes only information on malfunctions occurring during performance of operational-category servicing and maintenance (preflighting, sortie regeneration, and following flight operations), for it is precisely these which determine the level of reliability of specific aircraft with the currently-employed servicing and maintenance system, status of the aircraft fleet, aviation engineer service personnel proficiency levels, and organization of aviation engineer support.

A record of information is kept on an aircraft-by-aircraft basis, in a special log, with the only entries being malfunctions for reasons not involving erroneous actions by flight personnel, since these are difficult to predict due to a great many perturbing factors. In addition, they are insignificant as regards percentage share and should be separately studied and projected.

The aircraft fleet is examined under identical conditions, that is, log operating time and number of malfunctions are taken for a specific period of operation and maintenance (usually for a year) and from the moment of initial operation or since the most recent overhaul.

After this, one determines the place of each aircraft in the logged tach time-number of malfunctions coordinates and runs a line of mean reliability, the angle of slope of which is determined as follows:

$$\frac{\sum_{i=1}^n T_i}{\sum_{i=1}^n N_i}, \text{ rad}$$

Where T —hours logged during the period in question by i aircraft; N —number of malfunctions occurring on i aircraft during the period in question; n —number of studied aircraft in a specific aircraft fleet.

It is now obvious that those aircraft in the fleet in question which are positioned below the mean reliability line require a greater amount of preventive maintenance, and vice versa.

Consequently the differentiation we have performed makes it possible to manage the process of improving the qualitative parameters of a specific aircraft fleet by displacing aircraft in the direction of the mean reliability line, and consequently also by increasing the slope of the line.

Planned for the second phase of the analysis are organizational and technical measures to increase the reliability of specific aircraft on the basis of individual statistics in the following areas: recording and synthesis of positive work experience by individual maintenance personnel; more specific intervention by aircraft maintenance personnel into the operation of components and systems by changing the extent of performed preventive maintenance procedures; periodic evaluation of the effectiveness of intervention by aircraft maintenance personnel pertaining to changing the position of specific aircraft relative to the mean reliability line; adjustment in the logging of operational time on aircraft in the process of increasing aircraft reliability; determination of a trend in change in aircraft reliability according to years in operation; selectivity in using aircraft for flying training missions which differ in degree of complexity and importance in relation to their technical state.

Utilization of this simple and effective method and implementation of the above-discussed trends will have its own features in each specific instance and will require the most detailed study, since only under this condition is it possible to reduce labor outlays and maintain the reliability level incorporated at the time of aircraft manufacture or overhaul.

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Motor Vehicle Accident Rate High in Soviet Air Force

90R10001P Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 8, Aug 89 (signed to press 5 Jul 89) pp 32-33

[Interview, published under the heading "Implementing the Decisions of the 19th All-Union CPSU Conference," with Maj Gen Avn Yuriy Ivanovich Kolyaskin, chief, Air Force Motor Transport Support, Gas and Electric Service, by AVIATSIYA I KOSMONAVTIKA special correspondent Lt Col V. Dolgishev: "Dialectics of Change"]

[Text] All Activities of Air Force motor vehicle operations personnel are today permeated by a revolutionary spirit of restructuring. The fast-paced rhythm of summer combat training requires of each and every individual personal effort, mobility, and effective work performance in the spirit of the demands, guidelines and decisions of the 27th CPSU Congress, the 19th All-Union CPSU Conference, and subsequent CPSU Central Committee plenums.

Problems pertaining to activating the human factor, increasing the sense of responsibility on the part of specialist personnel, their professional competence, affirmation of social justice, improvement of leadership style and methods, and forming in command personnel a closeness to their subordinates were discussed at a scientific and practical conference titled "On Reducing Motor Vehicle Accidents in Air Force Units." The conference was attended by representatives of the USSR Ministry of Defense Main Motor Transport Directorate, USSR State Motor Vehicle Inspection, the Main Military Procurement, the Air Force Military Council, high officials from the Main Staff of the Air Force and Air Force Political Directorate, commanders and first deputy commanders of Air Force large strategic formations chairing traffic safety boards, combined unit and unit commanders, deputy chiefs of political sections, chiefs of motor transport support, gas and electric service of large strategic formations, combined units, and units, commanders of motor transport support companies, their deputies for political affairs and technical affairs, platoon commanders, vehicle inspection station chiefs, and the top drivers in Air Force units.

Maj Gen Avn Yu. Kolyaskin, chief of the Air Force Motor Transport Support, Gas and Electric Service, replies to questions put by AVIATSIYA I KOSMONAVTIKA special correspondent Lt Col V. Dolgishev.

[Dolgishev] Yuriy Ivanovich, what is the reason for this conference?

[Kolyaskin] As the Commander in Chief of the Air Force noted in his introductory remarks, in the last two years the Air Force has failed to see a radical decrease in the number of accidents and criminal offenses involving Air Force and privately-owned motor vehicles. Both military personnel and civilians are being killed and maimed

while preparing for the road, during repair, maintenance, loading-unloading, and operation of motor vehicles. And this is happening in spite of increased demands on all persons in authority, considerable preventive effort, and the conduct of preventive measures, including traffic safety competition. What is the problem? Apparently the principle of a systems approach to this problem is not yet being implemented. Commanders, staffs, and political agencies are insufficiently effectively implementing the demands of guideline documents. For some reason many officials, supervisors, and leader personnel of Air Force large strategic formations, combined units and units are of the opinion that only persons directly involved in motor vehicle operation should take part accident prevention efforts. This of course is not contributing to development and practical implementation of a correct strategy for carrying out party decrees and the requirements of USSR Minister of Defense orders in matters of strengthening military discipline and the campaign against motor vehicle accidents. The Commander in Chief concluded that the main thing is to move from quantitative approaches in addressing this problem to qualitative parameters, first and foremost activation of the human factor, for all the principal and determining areas of indoctrination, job proficiency of military motor transport personnel, improving their working and living conditions and raising their level of awareness, discipline, political state and morale are focused and concentrated in the human factor.

The topic of discussion at the conference was how to implement all these points in a practical manner and how to make more substantial the contribution by all categories of military personnel toward reducing motor vehicle accidents in the Air Force.

[Dolgishev] The "undeclared war on the roads" is continuing. A total of 273,268 highway and traffic accidents occurred in this country last year alone, with 47,197 fatalities and 297,605 injuries. The number of fatalities per 10,000 vehicles is several orders of magnitude higher in this country than in countries with higher relative motor vehicle use figures, such as the United States, Great Britain, West Germany, Czechoslovakia, and the GDR. The financial loss caused by motor vehicle accidents runs into billions of rubles.... How are the problems of traffic safety being resolved in the Air Force? What kind of statistics are we showing?

[Kolyaskin] The entire daily life and activities of military motor transport personnel are focused on performing their principal task: to support accomplishment of combat and mobilization missions assigned to Air Force units and subunits. Command authorities, political agencies, staffs, and officers of the motor transport support, gas and electric service are doing a great deal of work to prevent motor vehicle accidents, which has resulted in stopping the incremental growth of motor transport accidents in Air Force units involving official vehicles, in contrast to the previous year. We should note

that the overwhelming majority (approximately 98 percent) of Air Force units are doing their job right, constantly maintaining operational readiness of Air Force units at an adequate level, and have had no motor vehicle accidents for an extended period of time. I could name entire large strategic formations in which these negative elements have been totally eradicated.

On the whole, however, the task of accomplishing a radical decrease in accident figures in the Air Force has not yet been accomplished. In 1988 a number of motor vehicle accidents took place in Air Force units which resulted in death and injury. The situation regarding motor vehicle accidents is particularly poor in the Northern Group of Forces, Far East Military District, Carpathian Military District, Western Group of Forces [formerly GSFG], and Transbaikalian Military District. More than 50 percent of motor vehicle accidents have occurred in the air forces of these five districts. Unfortunately the seriousness of motor vehicle accidents has increased somewhat. The gravity-of-accident factor (number of fatalities per fatal accident) ran 1.15, as compared with 1.12 the previous year. Motor vehicle accidents are continuing to occur this year. One is particularly concerned by the fact that the causes of motor vehicle accidents continue to be the same ones.

[Dolgishev] Could you give us a more detailed analysis of the motor vehicle accidents which have occurred in Air Force units?

[Kolyaskin] Studies indicate that 40 percent of accidents did not involve public roads, that is, they took place at airfields, in motor pool areas, and elsewhere on base—precisely where there should be rigorous monitoring of military motor vehicle drivers by the appropriate personnel of units, garrisons, and Military Motor Vehicle Inspection elements. Accidents break down as follows into types: running into or over a pedestrian is the most common type (46 percent). All such accidents have occurred as a result of violation of the rules and procedures of passing and maneuvering, including accidents involving collision with other vehicles or obstacles (21 percent of total accidents). 25 percent of motor vehicle accidents involved vehicle collisions, and 8 percent involved vehicles overturning.

We should emphasize that the largest number of motor vehicle accidents involve relief of drivers and approving drivers for unsupervised motor vehicle operation. More than 60 percent of accidents involving motor vehicles take place when a driver is in his eighth or ninth hour behind the wheel, due to fatigue and loss of sense of caution as a consequence of regularly working overtime.

A large number of serious accidents occur between 1800 and 2100 hours, when vehicles are returning to the motor park after flight operations have ended. At this time the airfield technical support duty officer has packed it in, and the motor park duty NCO is also relaxed, for all the vehicles are out; at this time the

drivers have been left to their own devices. This established, flawed system of lack of supervision has taken root so firmly that the various authorities at the large strategic formation, combined unit, and unit level view it as a normal situation, which creates, to put it frankly, a favorable environment for various violations of rules and regulations.

In analyzing the causes of motor vehicle accidents, we should note that the overwhelming majority (more than 60 percent) involve lack of discipline on the part of drivers and ranking personnel aboard, which as a rule has been manifested in violation of motor vehicle operation rules and regulations: driving with excessive speed in hazardous conditions, crossing into an oncoming traffic lane when passing, and failure to yield right of way at intersections. Additional items include failure to observe safety precautions, driving while intoxicated, failure to observe proper rules and procedures at railroad crossings, turning over the wheel to another driver, and removal (unwarranted) of a driver from behind the wheel. The relatively small number of accidents caused by inadequate training (approximately 20 percent) and for other reasons (9 percent) unequivocally attests to the fact that principal efforts must be concentrated on eliminating the first group of causes. Practical experience indicates that in those units where indoctrination work with individual drivers is lacking, where internal routine and administration in motor pools and motor parks is poorly organized, and where the level of demandingness of command personnel is low, fatal and nonfatal motor vehicle accidents are most probable.

In one of the units at the Kacha Higher Military Aviation School for Pilots, for example, Pvt R. Vagabov, taking advantage of a lack of supervision, in collusion with motor pool duty NCO Jr Sgt G. Maggaramov, took a truck without permission to drive to a neighboring village. As he was returning, Pvt R. Vagabov failed to yield to a Moskvich passenger car which was proceeding down the main highway and collided with it. Two persons were killed and three were injured as a result of this accident. A subsequent accident investigation revealed that there had also been previous occurrences of going AWOL from this unit. Repeated checks and inspections, however, failed to result in effective steps being taken to impose proper observance of regulations in the motor pool and in the subunit. Of course the guilty parties were severely punished, but that does not make up for the loss of life.

[Dolgishev] Yuriy Ivanovich, your address at the conference contained the point that in general terms we have two problems to resolve: driver training, and driver education or indoctrination. But this involves considerable material and labor resources, and in particular a good deal of joint effort by all appropriate personnel in this matter, and not only Air Force Motor Transport Support, Gas and Electric Service personnel.

[Kolyaskin] We in fact have considerable reserve potential in this area. For example, a certain number of

accidents involving fatalities and injuries take place at airfields and motor parks when vehicles are backing up, being towed, and being parked. Investigation indicates that drivers are not familiar with elementary safety procedures, and this means that their commanders are failing to carry out the requirements of Article 57 of the Interior Service Regulations of the USSR Armed Forces, which reads: "A commander (superior) shall establish required safety procedures to be followed when handling weapons, combat and other vehicles and equipment, during march, and during the conduct of field training exercises.... They shall promptly communicate these measures to subordinates and shall demand their strict implementation." Unfortunately at times certain commanders of large strategic formations, combined units, and units are not always guided as well by demands of the USSR Minister of Defense: "Prevention of accidents in motor and rail transport shall be considered one of the most important component parts of the work performed by commanders (superiors), staffs and political agencies to strengthen military discipline."

Up to the present time insufficient attention has been devoted to improving organization of operation and maintenance of motor vehicles and specialized ground equipment. Faulty planning and scheduling continues to persist, where there is failure to consider the needs of aviation technical units, and time is not allocated for equipment servicing and maintenance, training and educating drivers. An unwarrantedly excessive number of vehicles and personnel are frequently requisitioned to support air unit operations. This results in wasteful use of equipment, makes it more difficult to maintain equipment in proper working order, while personnel are excessively work-loaded. The length of the work day runs up to 20 hours for some drivers involved in flight operations support activities, and frequently they get as little as 4 hours sleep. Regular failure to get sufficient rest and sleep leads to driver exhaustion. This of course cannot be tolerated. There are guideline documents which specify standard figures for expenditure of vehicle mileage and vehicle-hours per year and per hour of logged flying time. A stricter approach to resolving this problem is currently being mandated.

As we see, the activities of the aviation engineer service, Air Force unit commanders, their staffs, base commanders, and political agencies are of considerable importance in matters of maintenance and organization of utilization of trucks and specialized vehicles. It is these personnel who establish order and procedure in submitting equipment requisitions, in using vehicles, in traffic procedures, in access and entry regulations and procedures, and in organization of air force base Military Motor Vehicle Inspection activities. Their activities represent a considerable instrument for preventing motor vehicle accidents and near mishaps involving motor vehicles and aircraft.

[Dolgishev] Nevertheless the driver is the principal figure in motor vehicle accidents. There are many problems in this area, and this was discussed at the conference.

[Kolyaskin] Driver education is the main link which ensures traffic safety. The continuous process of performing flight operations support activities as well as other work activities, which on the whole run 16-18 hours a day, frequently makes it impossible to organize this work at a level which would enable us to maintain a high degree of military discipline and order.

This problem is rooted in the fact that there is lacking in technical subunits a firm, proper schedule of daily routine, morning inspections, physical training, training drills, and assembly of personnel for taking meals. All this negatively affects drivers' perception of the requirements of regulations and manuals and unwittingly teaches drivers to look for opportunities to violate regulations and procedures. The driver's job is very hard; in addition to physical exertion, it involves considerable nervous stress: in the course of driving his vehicle he must constantly analyze and evaluate the situation and make flawless decisions. Statistics and analysis of accidents, as we have already stated, indicate that many accidents are caused by change in a driver's working efficiency and fitness. Fatigue dulls a driver's powers of attention and slows his ability to react quickly to that which takes place around him. An unorganized workday, heavy physical work load, inadequate sleep, and working at night lead to this state. A primary task in this area is to regulate and adjust the workday of vehicle drivers and to meet the requirements of the Air Force Commander in Chief directive pertaining to this matter.

[Dolgishev] What practical steps are being taken in this direction?

[Kolyaskin] One of the main items is to create normal working conditions for vehicle drivers, ensuring at least eight hours sleep and adequate off-duty living conditions.

Can this be accomplished? Yes, it can. An example of this is the housing and services complex at a certain Air Force logistic support depot. The depot's motor park is acknowledged to be one of the best in the Air Force and USSR Ministry of Defense. This motor park did not simply spring up spontaneously; it was established and developed by the truck drivers and command personnel at all echelons: platoon, company, depot, and division command element. This is a graphic example of what can be achieved in line units with a responsible attitude toward observing the requirements of orders, directives, regulations, and other documents governing the activities of military personnel and organizations. It is not mere happenstance that at this depot there have been no motor vehicle accidents for an extended period of time. The division commander, together with the political section, staff, and depot supervisor personnel, handles matters pertaining to preventing motor vehicle accidents

and accident-threatening incidents, and he demands this of all categories of personnel, rather than counting solely on the motor transport support, gas and electric service. This example is worth emulating; it meets the most up-to-date demands. At the present time more than 30 percent of motor parks have housing and personnel services facilities, and work is continuing in this area.

We are looking for new approaches, methods and forms of organization of the activities of military motor transport personnel. Toward this end an experiment was conducted in Air Force units, resulting in reorganization to a two-company airfield technical support battalion. It was now possible to support flight operations shift by shift, sequentially, with different technical support companies. A new flight operations airfield technical support duty officer is designated for each flight operations shift. This will make it possible significantly to reduce (to 10-11 hours) the time drivers will be required to spend on the airfield, and on this basis it will be possible better to regulate their workday and off-duty time and to create normal conditions for thorough study of the equipment and organization of the indoctrination process. There is an increase in the number of officer-indoctrinators at the company level and a decrease in the number of vehicles assigned to subunit commanders, which promotes improved organization of accident-free motor vehicle operation.

Construction of centralized power supply systems and compressed-air charging at airfields is of considerable importance for shortening driver work time. We are placing considerable hopes on reducing the number of motor pools and motor parks at air force bases and eliminating small motor pools, which as a rule produce the largest number of motor vehicle accidents. The fact is that in small motor pools it is more difficult to organize internal duties and administration in conformity with guideline documents, servicing and maintenance operations, and equipment inspection.

We must thoroughly analyze the possibility of consolidating motor pools and motor parks and sequentially accomplish implementation of this conference decision.

Consolidation of the efforts of all categories of Air Force personnel, elaboration of a joint strategy, and a focus on radical changes in efforts to prevent motor vehicle accidents during flight operations support as well as involving privately-owned vehicles will without question promote further improvement in the quality of training and indoctrination of military motor transport personnel, drivers of complex trucks and specialized vehicles, accident-free operation of this equipment, assured support for the operation of modern aircraft, and a high level of operational readiness of Air Force units and subunits.

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Officers' Legal Questions Answered

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[Article by Col Justice S. Kuznetsov: "Legal Consultation"]

[Text] The editors receive letters from Air Force personnel in which the authors ask for explanation and clarification of various legal matters connected with performance of military service. In view of the importance of these matters for all categories of military personnel, the editors, beginning with this issue, will be presenting replies on the pages of this magazine.

Sr Lt V. Kolosov: Does the unit command element have the right to delay the processing of materials pertaining to promotion to the next higher military rank?

Answer: Pursuant to the Statute on Performance of Military Service by USSR Armed Forces Officer Personnel, ratified by decree of the USSR Council of Ministers effective March 1985, military personnel shall be sequentially promoted to the next higher officer rank with a positive efficiency report, if the next higher military rank is in conformity with the military rank prescribed for the position held, and after serving the specified period of time in the preceding military rank or grade.

The recommendation for rank or grade promotion shall be submitted in advance, in such a manner that the required time of service in grade is satisfied as of the day of submission of the recommendation for consideration by the superior officer empowered to award the corresponding rank or grade.

Officers with substantial deficiencies in performance of job-related duties and in their personal conduct, by decision of a direct superior, from commanding officer of separate battalion, regiment, equivalent or higher, shall not be recommended for promotion to the next higher military rank until such deficiencies have been corrected. The reasons for such a decision shall be explained to the officer in question in a personal interview.

Capt V. Tolstikov: When reduction of personnel occurs, am I entitled to insist on being offered an equal or higher job assignment or position?

Answer: Article 30 of the above-cited statute states that when reduction of personnel occurs, officer personnel may be moved from higher to lower job assignments or positions by direct superiors within the limits of their authority to assign to job duties or positions, under the condition that there is no possibility of appointment to an equal or equivalent position within the corresponding branch of the USSR Armed Forces. Persons transferred to lower positions on the basis indicated above shall be shown preference in job promotion if they meet the requirements for holding job assignments or positions equal to their previous positions.

Maj B. Nagayev: What is the procedure of removal from position and imposition of disciplinary punishment in the form of demotion?

Answer: Billet reassignment with demotion as disciplinary punishment shall be carried out in conformity with the requirements of the USSR Armed Forces Disciplinary Regulations, by superiors who possess such authority. It should be borne in mind that if the positions in question are not stated in the Disciplinary Regulations, the rules and procedures of Article 12 of the Disciplinary Regulations shall apply, pursuant to which officers possess disciplinary authority in conformity with the military rank prescribed in the table of organization for the position held.

In extreme cases not permitting delay, removal from position shall be performed by superiors authorized to make billet assignments.

Maj N. Khvorostenko: Please explain the specific features of pension provisions for military personnel discharged into the reserves in connection with the substantial reduction of the USSR Armed Forces.

Answer: Pursuant to a decree of the USSR Council of Ministers (published by order of the USSR Minister of Defense in March 1989), upon discharge in connection with reduction of the USSR Armed Forces, military personnel with 20 years of service to their credit for purposes of figuring benefits, regardless of age on the date of discharge, shall receive a pension in the amount of 40 percent of base pay and allowances. An additional 3 percent of base pay and allowances shall be added incrementally for each year of service from 20 to 25 years inclusive, but the total shall not exceed 50 percent of base pay and allowances.

Commissioned officers who have reached the age of 50 as of the date of discharge and who have not less than 25 years of total employment to their credit, not less than 12.5 years of which consists of service in the USSR Armed Forces, shall receive a pension in the amount of 40 percent of base pay and allowances, and with 30 years of total employment, including not less than 15 years in military service, the pension shall amount to 45 percent of base pay and allowances.

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Space Technology Benefits To the Economy

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[Article, published under the heading "The Space Program Serving the Economy," by Candidate of Technical Sciences V. Filin, deputy chief designer of the Energiya space shuttle launch vehicle system: "Contribution to Perestroika"]

[Text] Aware of the benefits of applied space activities, many countries are spending money on the development of their own satellites. In this country, however, even among USSR people's deputies there are those who propose cutting back the development of this vanguard branch of the economy. Why is this happening?

Unquestionably not everybody knows, for example, what lies behind development of the Energiya space shuttle launch vehicle system, what an industrial potential has been created, how many formerly unknown materials have been produced, how many advanced industrial processes have been developed, and how much various equipment has been built on the basis of new physical principles. This is due to the fact that until recently the developers of rocket and space hardware, for well-known reasons, did not adequately publicize their achievements. In this article we shall attempt to fill in this gap. We shall discuss the recording and processing of various parameters pertaining to the state of large systems, the economy's need for which is manifest.

The words "flight nominal," to which we have all become accustomed, hardly indicate how much labor stands behind this bit of information, and yet it is a difficult task to determine the state of space objects located hundreds, thousands, and sometimes even millions of kilometers from us. Accomplishment of this task requires the development of sophisticated, highly-sensitive devices, including equipment to collect and onboard-process information, transmitting equipment, including antennas and transmission lines, and systems to receive, process, and interpret information received from space.

As we can see, it is a long road for the scientists and engineers to the words "flight nominal," although measurements of parameters take only milliseconds, analysis of the status of objects is accomplished within seconds, and data transmission does not exceed a few minutes. The labor of hundreds of workers, radio engineers, antenna specialists, specialists in electronics, programmers, and process engineers is required to obtain this information and to forward it to consumers as a flight progresses....

Hundreds of new sensors, transducers, thermometers and thermocouples, vibration-type accelerometers, equipment for processing large streams of data, and packages of applied and scientific software for data analysis were produced in the process of development of the Energiya-Buran system and development of telemetry facilities. The most varied branches of the economy (machine building, agriculture, power engineering, etc), utilizing the developed aggregate of resources for extensive diagnostics of the status of equipment and systems, can increase their reliability and productivity at minimum cost, for it is economically more advantageous to use means and methods (even with certain modification) which have already been developed and certified under the most rigid conditions, than to develop them from

scratch. Experts estimate that annual savings from adoption into the economy of measuring devices just for the rocket and space industry alone will exceed 500 million rubles. This savings is achieved by extending the service life of high-stress equipment, early diagnostics on highly complex mechanisms, and comprehensive analysis of the state of combined systems.

Just what marvelous means and methods are these, which enable us to achieve such savings? We shall endeavor to demonstrate with specific examples. As we know, the quality of the final product (instrument, component, system) also depends on the quality of manufacture of the individual parts and their assembly. Expenditure on effective monitoring of component parts and assemblies in various industries are as follows (as a percentage of the total cost of the end product): 5 percent in shipbuilding; 10 percent in pipeline construction; up to 15 percent in the aircraft industry; up to 20 percent in rocket engineering.

Today's machine building industry uses more than 1,500 types of diagnostic equipment, which can be arbitrarily subdivided into 10 types: magnetic, electric, eddy-current, radio-wave, thermal, optical, acoustic, penetrating, etc.

As a rule, practically throughout industry individual full-scale samples are tested in order to obtain a comprehensive evaluation of the operating characteristics of product items. This results in large arrays of separate characteristics, which one must be able to process and synthesize. Do materials, parts and assemblies have common properties which, like a mirror, reflect the state of an entire unit of equipment?

Studies have shown that the state of the microstructure of thin surface layers also reflects the properties of a machine part as a whole. What was needed was to devise a method and tool which would provide capability to describe these properties based on the state of the surface layer. This task was accomplished by using a gauge which rolls across the surface of a part. Effect on the contactor depends on the force of resistance of rolling friction, which in turn depends on the properties of the surface proper. This effect, converted into an electrical signal, indicates elasticity, homogeneity, roughness, and structural strength of the specimen being examined. It was determined that the surface layer of any part altered this structure fairly substantially in relation to its total time of operation.

Using this technique to measure and compare corresponding characteristics on specimens, one can apply a specific method to conduct routine, current evaluation of the actual condition and status of a component part. Experts estimate that utilization of this method, which is protected by patent, provides capability to predict the onset of a critical state, and this in turn leads to a substantial (by two to three orders of magnitude) increase in actual service life. Obviously this method will find widespread application in electrical equipment,

automotive engineering, and shipbuilding, particularly since a fairly simple and versatile device has been developed, which can be used in various industries and will make it possible with up to 85 percent probability to characterize the actual state and condition of various components.

This technical diagnostic technique and, of course, the device for implementing it will be of interest to specialists in many branches and sectors, not only in industry but also in agriculture, in transportation—wherever it is necessary to determine the condition and expected service life of instrumentation and machinery.

There is probably no industry in which fluid-flow pumps are not used. These include the petrochemical industry, machine tools, automotive industry and shipbuilding, the dairy industry, and public utilities. Anybody who has ever taken apart a pump has noted the working surfaces which create pressure. These surfaces are fairly far from ideal after a certain time in operational service.

Those who design or operate centrifugal pumps are particularly well familiar with that feared word "cavitation." There have been persistent efforts to control this phenomenon ever since the first such pumps were built. All calculations and precautionary measures can be nullified if the liquid entering the inlet of a high-power pump contains foreign matter which exceeds a certain standard. This can be both gaseous and solid particles. Rocket engineers were the first who were forced to put out an all-out effort in tackling this problem. They worked aggressively to devise various solutions and sought effective methods of combating this phenomenon.

A sensor was developed—a transducer measuring continuity of flow—based on the principles of change in the capacitive and inductive characteristics of a liquid medium containing foreign matter. Placing such a sensor in the line through which a liquid (water, gasoline, crude oil, milk, etc) passes into a pump provides capability to measure with up to 2 percent accuracy the continuity of flow in lines up to 150 millimeters in diameter. By feedback-linking the sensor to a drive motor, cavitation caused by substandard liquid flow can be reduced practically to zero. Using such a sensor-transducer together with a flow sensor makes it possible to determine the mass flow rate of a liquid with a high degree of accuracy, which is of considerable importance when seeking to obtain accurate automatic metering of liquid constituents. We could cite many more applications of these miracle sensors.

Measurement of fuel level or, as the professionals say, the "liquid-gas" boundary has always been a matter of interest to people involved with technical equipment. Nor is this surprising, since one can avoid various unpleasantnesses by knowing the actual level of a liquid. Uses include warning of imminent fuel exhaustion,

warning of precipitates from conveyed liquid getting into pumps, as well as regulation and adjustment of tank filling process.

Rocket engineers, for whom it is extremely important to know the exact level of fuel and the processes of its oscillation or sloshing in the tanks, have developed simple, reliable means of measurement of levels between zero and 40 meters, with a measurement accuracy of 2 mm. Designed in a fire- and explosion-safe version, with triple redundancy in sensors and transmitting circuits, these devices can be very beneficially used in the chemical industry, gas industry, petroleum refining, and other industries. Remote measurement of tank levels will make it possible substantially to improve and facilitate labor, as well as protecting the health of operators, especially those whose job directly involves such measurements.

Whoever has seen a rocket launch will never forget the mystery and grandeur of this sight. The massive tail of flame, so bright and colorful, especially against the night sky, shows what enormous energy is required in order to overcome the earth's gravity. Rocket engineers tried a great variety of fuel components until they settled upon and obtained capability to handle highly-efficient cryogenic fuels.

Various kinds of fuels were used in the process of evolution of rocket engineering, but gradually they were rejected for various reasons: some did not yield sufficient energy, while others were rejected out of environmental considerations. Today it is simply intolerable not to consider environmental factors, since rocket launches are so frequent.

Today rocket engineers have learned extensively to utilize such high-energy and virtually harmless components as hydrogen and oxygen. Space and rocket technology essentially pioneered their commercial-scale production.

Working with these components requires overcoming serious technical problems, as well as thorough training and preparation, both theoretical and practical, for the temperature of liquid hydrogen is minus 253° C, while that of liquid oxygen is -180° C. For this reason knowledge of as well as continuous and accurate monitoring of the state and condition of structural components, including actual temperatures, becomes very important. Special thermometers have been developed for this purpose, with a measuring range from +50° to -253° C. These devices are designed with observance of all standards pertaining to fire and explosion safety, vibrational and acoustic stresses. Pressure sensors capable of measuring absolute pressure from 0 to 5 atmospheres and capable of withstanding shock of up to 400 g have also been developed for these operating conditions.

Various types of cables are used on rockets, forming the onboard cable network. A large number of cable connectors are needed to connect cables to various instruments and sensors. Anyone who has ever stuck an electric plug into a wall receptacle has noticed the brief spark or small

electric arc. We frequently observe small discharges occurring even in a plug connected in a receptacle. Such discharges obviously cannot be tolerated in rockets using dangerously explosive fuel components.

Development and thorough experimental testing and refinement of totally safe electrical connectors was one of the most important tasks in designing the Energiya launch vehicle, involving years of intensive search for effective solutions. It is theoretically impossible totally to prevent sparking in electrical contacts. For this reason the development of safe connectors proceeded in two directions. The first involved reducing sparking on electrical contacts to a minimum by employing high electrical-conductivity materials and explosion-safe connector design. The second direction involved ensuring a high degree of plug-receptacle electrical connection seal. Test results showed a high degree of gastight seal (up to 10⁻⁴ mm Hg), sufficient to ensure guaranteed protection against explosion.

Unquestionably such electrical connectors will find widespread application virtually wherever there is an explosion-hazard environment, such as in mines, chemical plants, etc.

In addition to the above, we should mention certain other unique products. These include shaft rpm transducers capable of measuring from 300 to 60,000 rpm with a 1 rpm error, as well as thermometers, thermocouples, and associated transducers with a measuring range from -200° C to +1400° C. Thermometer measurement accuracy runs 0.1° C, and thermocouple accuracy—5° C, even in such harsh operating conditions. Other items include strain-gauge sensors for measuring forces, capable of measurements up to 350,000 N, deformation sensors with a measurement range of plus over minus 3000 microns per meter, acoustic pressure sensors capable of measurement in a range of 0 to 180 decibels, as well as many others.

We could enumerate an additional more than 100 highly-sophisticated sensors, transducers, connectors, instruments, and devices which were developed in the course of designing and building the Energiya launch vehicle. The economy unquestionably needs all these items, and one can only regret that they have not been adequately publicized up to the present time.

With adequate information on the capabilities and significance of the rocket and space industry to the nation's economy, questions would not arise pertaining to the effectiveness of utilization of the money and resources invested in this industry. This industry is highly effective and efficient. The problem lies elsewhere: to what extent is the economy capable of absorbing all the advances being made in rocket and space technology? The future lies with advanced science and technology and science-intensive production processes, and the sooner we realize this fact, the more rapidly and effectively scientific and technological advance will occur, making a substantial contribution to our perestroika.

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U.S. Science, Industry, Academia Accused of Furthering Militarism

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in Russian No 8, Aug 89 (signed to press
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[Article, published under the heading "Today's World and the New Thinking," by Candidate of Economic Sciences Lt Col V. Staroplov: "Science in the Service of Militarism"]

[Text] "We are not forgetting the threat to peace presented by imperialist militarism, and we feel that there are as yet no guarantees of the irreversibility of the positive processes which have begun. The new political thinking enables one both to see and find new possibilities of standing up against a policy of force on a broader political basis than in the past."

From the proceedings of the 19th All-Union CPSU Conference

In a critical period of development of world civilization, faced with the danger of nuclear catastrophe, the CPSU proclaimed the need for new political thinking. In the broad sense it boils down to the position that today states can protect themselves not with military hardware but only by political means, acting in concert and seeking to form an all-encompassing system of international peace and security. "For the first time since the war and, perhaps, for the first time in history," noted Comrade M. S. Gorbachev in a speech at a get-together with working people in Kiev, "our country's security has become stronger not by a buildup of military power and not by increasing the already enormous expenditures on defense. On the contrary, we were able to proceed with a reexamination of our military doctrine in an unambiguously defensive spirit."

Measures undertaken by the Soviet Union to eliminate an entire class of intermediate-range and shorter-range missiles and an initiative aimed at accomplishing a substantial unilateral reduction in its military forces and the practical destruction of chemical munitions are of exceptional importance for improving the international climate.

This Soviet policy finds understanding and approval among the public and official circles in many countries. Even Pentagon spokesman D. Howard, commenting on the Soviet program of unilateral reduction of forces and arms, stated: "We applaud this decision by the USSR."

What response steps is the United States taking? According to the U.S. secretary of defense, the Bush Administration has decided to reduce by 10 billion dollars the Department of Defense budget for Fiscal Year 1990, and in particular to freeze work on the Stealth bomber. At the same time U.S. State Department

official spokesman (Ch. Redmen) declared: "NATO will continue to maintain in Europe modern military forces and the minimum amount of nuclear weapons essential for a strategy of deterrence." He stated that "NATO has a program to modernize nuclear weapons in Europe, a program which is currently underway."

Thus the NATO countries, headed by the United States, are still seeking to gain superiority over the USSR and the other Warsaw Pact countries. Today these efforts are concentrated primarily in the military technology area. Militarization of scientific and technological advance in the leading capitalist countries has reached an unprecedented scale, particularly in the United States. A "military-industrial-university complex," which serves the interests of the Pentagon, has essentially been formed in that country.

Enormous amounts of money are being allocated toward the successful functioning of this complex. Such spending will exceed 38 billion dollars in Fiscal Year 1989 (13 percent of the Department of Defense budget). The largest portion of appropriations is being channeled into research and development projects. The United States is spending seven times as much on the development of modern military equipment and weapon systems as the rest of the NATO member nations combined. Approximately 42 percent of the country's scientists are being involved in military projects.

Those commands which function in the area of logistic support are playing the principal role in the conduct of research and development and in organizing weapons and military equipment procurement in each of the armed services. One can judge the scale of their activities by the Air Force Systems Command, which employs more than 28,000 military personnel and 30,000 civilians. It oversees more than 20 different weapon system projects at various stages of development. On the whole this command oversees more than 24,000 contracts representing approximately 141 billion dollars. They include the ultramodern project to develop Stealth aircraft.

The U.S. Defense Department's scientific research complex encompasses hundreds of different establishments: scientific research centers, laboratories, proving grounds, test facilities, etc. The Livermore and Los Alamos national laboratories—genuine "incubators of nuclear death"—which are under the Department of Energy, conduct military research and development on a large scale. Warheads for the Poseidon and Polaris ballistic missiles and cruise missiles, as well as neutron weapons, nuclear bombs for strategic bombers, and other U.S. nuclear weapon systems were designed at these laboratories. The Livermore National Laboratory has become one of the principal sites of SDI research.

Scientific research organizations of the U.S. armed forces handle only about one fourth of the total volume of military research and development. The bulk of these

activities are performed by private industry, large military corporations. They include the well-known Pentagon contractors General Dynamics, Northrop, and Grumman, which play an important role in the development and building of aerospace hardware.

These contracts are profitable to the corporations involved. When it places contracts with military-industrial firms, the U.S. Government itself finances a substantial portion and sometimes the bulk of these companies' total volume of research and development activities. In the mid-1980's, for example, government's share of overall research and development expenditures in the aerospace industry totaled almost 73 percent. An analysis of 140 major arms manufacturing contracts conducted by the General Accounting Office indicated that over the last 10 years average profit on capital invested by military corporations has run 56 percent. We should note for comparison that during this same period profits of 500 leading industrial corporations not involved in military contracts did not exceed 14 percent.

Corporations which obtain research contracts from the Pentagon establish first-class laboratories filled with modern equipment and staffed by highly-qualified specialist personnel. Lockheed Aircraft's Palo Alto laboratory, for example, employs 550 persons, including almost 200 persons with doctorates. This company's top minds were enlisted in the project to develop the F-117A Stealth fighter.

Some large military-industrial monopolies even maintain social sciences research centers, which engage primarily in "military-political forecasting." Of course the money invested in such research is not wasted: on the one hand the monopolies are helping to retain an atmosphere of war hysteria in that country, while on the other hand they are attempting to influence the Pentagon's military technology program, forcing it to plan the development of weapon systems which assure the corporations' financial prosperity.

One of the main directions being taken in the militarization of science is subordination of university activities to military aims. The Pentagon endeavors to utilize the universities and colleges in a wide spectrum of activities. They account for considerable applied research and more than 40 percent of military basic research. University scientists are extensively enlisted to take part in the activities of various scientific consultative bodies and also serve as consultants on individual research projects. In addition, the universities train scientists and engineers to work at government scientific establishments and in military industry, and they take part in training reserve officers and in the advanced training of some categories of active military personnel. Universities and colleges take part in many military applied research projects. The spectrum of project research is quite broad: rocket technology and means of detection, lasers, electronic equipment and aircraft, artificial intelligence, chemical weapons and engineering psychophysiology,

new fuels and transport vehicles, new teaching methods to be used with military personnel, etc.

Private "nonprofit" organizations or "think tanks" are also drawn into the orbit of militarist preparations. The best-known of these is the Rand Corporation, which is financed chiefly by the U.S. Air Force. It conducts research on a broad range of problems pertaining to military policy and strategy. Systems analysis, various prediction and forecasting methods, the "planning-programming-budgeting" system, as well as other scientific methods widely employed in the U.S. armed forces, for example, were developed here.

The Aerospace Corporation is the largest of the "think tanks." Space exploration and utilization of space for military purposes has been the main thrust in its activities from the very beginning. The importance of this research organization is increasing in present-day conditions in connection with implementation of the "Star Wars" program.

In addition, the Pentagon uses the services of so-called conservative "brain centers." They not only draw up recommendations which are extensively used by the administration in implementing its militarist policy but also wage a propaganda campaign of unprecedented scope and intensity, aimed at ensuring public support for the Pentagon.

The Heritage Foundation is one of the best known of these organizations. Each year it publishes more than 200 books, monographs, and various studies, not to mention a great many "memoranda" sent to government officials. Nor is the President himself ignored. A so-called "Leadership Mandate" is prepared for him. Heritage Foundation spokesmen claim that 60 percent of the recommendations they sent to the Reagan Administration were adopted. In particular, they consider themselves initiators of the SDI program.

At the beginning of this year the foundation published a new volume entitled "Mandate for Leadership III. Political Strategy for the 1990's." In the opinion of its authors, in drawing up its foreign-policy strategy for the 1990's the new Administration must proceed from the position that "the USSR and its governmental system continue to represent the most significant threat to peace." Although, it goes on, one must also "consider the changes taking place in the Soviet Union as a consequence of the economic and political reforms being carried out in the USSR."

The apologists of militarism frequently claim that in the era of the revolution in science and technology "arms competition" accelerates overall technological advance, and through technological advance also stimulates economic development. They attempt to represent militarization of science practically as a benefit to society. Typical in this regard is a statement made by University of Pittsburgh President (U. Posvar): "When the Department of Defense finances research at universities and in industry, it is fostering the development of technical

innovations which strengthen our national security as well as stimulate general advance in science and technology, vitalizing the economy, and even helping improve the quality of life in our society." In the estimate of U.S. Department of Commerce officials, however, only 5 percent of new technical and technological developments are transferred from military industry over to the civilian sector, and the overall economic effect from utilized transferred technology, in the opinion of U.S. economist S. Melman, does not exceed 5-10 percent of military expenditures. In the aircraft industry, for example, only one tenth of military projects can find application in civil aviation.

These are the realities. In assessing them one can state that there have been no radical changes to date in the giant U.S. military-industrial complex. And this is understandable, for the new political thinking does not promote further enrichment of the military industrialists, the scientists and their allies, the Kremlinologists of various shades of ideology. The fact is that it is not profitable to them. On the other hand it brings such benefits as peace and prosperity to the peoples of East and West, North and South. Of course these values of incommensurable, and therefore common sense should win out.

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Cosmonaut Training Center Head Discusses Manned Space Program

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[Interview, published under the heading "Pertinent Interview," with Lt Gen Avn Vladimir Aleksandrovich Shatalov, head of the Cosmonaut Training Center, by AVIATSIYA I KOSMONAVTIKA: "The Manned Space Program Today and Tomorrow"]

[Text] Former Saratov teacher R. Gerchikova writes: "I would like to see in the magazine AVIATSIYA I KOSMONAVTIKA a response to Chingiz Aytmatov and his statement which appeared in the 2 April 1989 issue of PRAVDA on expenditures on the space program. This writer enjoys a great deal of prestige, and in addition he is a deputy to the USSR Supreme Soviet. This is no man in the street talking. Specialists and scientists working on problems of space exploration and research must give a response to him. In addition, the statement made by this respected individual kills initiative and creativity on the part of our young people. It pained me, as a publicizer and booster of the space program, to read his statement."

"It is obvious," writes V. Troshenkov, chairman of the Murmansk branch of the All-Union Astronomical and Geodetic Society, "that people want to know how much is being spent on space and what kind of revenues are generated as a result of space program activities. Unfortunately such information is presently lacking. An attempt to show people the purposefulness and expediency of

space exploration and research cannot be really effective without such information. I would like to express the hope that such information will be available in the near future.

"In addition, in connection with negative assessments of space program activities which have recently appeared, chiefly due to the substantial costs involved, I would like to make the following suggestion. All kinds of funds are presently being established to provide support and assistance to various programs. Why not establish a fund for private-citizen assistance to the space program?"

"The future of mankind is integrally linked with space. If a Kosmos [Space] fund is established, I will contribute to it. I am sure that there are many people both in this country and abroad who would support this idea."

Manned space exploration is presently a subject of concern to many of our readers. The editors asked two-times Hero of the Soviet Union Candidate of Technical Sciences Lt Gen Avn V. Shatalov, head of the Cosmonaut Training Center imeni Yu. A. Gagarin, to respond to these questions of interest to our readers.

* * *

[AVIATSIYA I KOSMONAVTIKA] Vladimir Aleksandrovich, let us begin with a question which you are the most qualified to answer: what does it cost to train a cosmonaut in this country?

[Shatalov] It is difficult to state a precise figure on the cost of training a cosmonaut, since the cost is determined by many factors. Certainly a large part of the cost is comprised of outlays on the facilities and equipment used for training. Equipment includes the modified Il-76 aircraft used as flying laboratories, which produce up to 10 periods of weightlessness during a single flight, as well as centrifuges, with their considerable power requirements, and the costly computer hardware which is used literally on all training simulators. When training includes practice and rehearsal of EVA procedures, the weightlessness simulation tank is used. Of course this causes a 20 to 30 percent increase in costs.

A cost estimate has been performed in the case of space flight by foreign nationals. I believe that the amount and extent of the training program should be stipulated when signing contracts for the training of foreign nationals. In such a case the cost will also be clearer. We will soon be training a Japanese mission specialist. Who is he? What is his specialization field? Does he know our language? What is his mission program? We do not yet know. On the average, however, training a foreign national as a member of an international crew has been estimated at 1 million dollars.

Our equipment is both experimental and highly complex, and any mistake in operating it or any design deficiency can be much more costly than the training proper. This is no place to cut corners. Training should be very thorough, utilizing all ground facilities, and it is without question difficult to make training inexpensive,

regardless of the abilities any individuals might possess. The only way to reduce the cost of training is to have cosmonauts fly multiple missions. Here we save in manpower and resources on general training for space flight, and we save time as well. The training program still runs about two years. Training includes spacecraft approach and docking, EVA, and functioning in space-suits. It is true that this training is also done in subsequent training phases, but applied to specific mission profiles.

Unquestionably the cost of training for a second, third, and particularly for a fourth mission will be less, possibly by an entire order of magnitude. This is why I mention the difficulties in estimating the cost of training. Evidently all costs should be added together and an average cost determined. We have never done this, however. We lack a method for performing such estimates, and nobody has ever asked us to do so. We have been concerned primarily with the end result: readiness by spacecraft crews to perform all mission assignments.

[AVIATSIYA I KOSMONAVTIKA] A question arises in connection with this: what about young cosmonauts, those who have never flown in space? How many of these do we need, and when will it be their turn to go up?

[Shatalov] As you have already noted, few newcomers indeed appear on the list of mission crews. We have endeavored to ensure that those who go up are tried and proven individuals who have had prior experience in space. But we are not forgetting about the young people. We are all getting older, using up our good years, and replacements must be readied. The cosmonaut corps has recently been joined by three newcomers. And there will be five more by year's end. We do not recruit a large number of cosmonauts, and therefore we do not have a long waiting line for missions. At the present time only three young cosmonauts at the Center are engaged in specific mission training, and we are free to make this statement, contrary to the practice up until recently.

All cosmonauts must be professionals, must maintain continuous fitness, and must be prepared for missions of any duration and complexity. I am not talking about those cosmonauts who will go up as flight engineers and mission specialists. They are selected by various ministries for participation in specific mission programs and receive full training at the Cosmonaut Training Center imeni Yu. A. Gagarin, after which their professional skills are honed at the facilities operated by the organizations of their ministries. Subsequently they are assigned to mission crews and receive additional training at the Center. The total number of such personnel is also small and is determined by the schedule of manned missions.

[AVIATSIYA I KOSMONAVTIKA] Vladimir Aleksandrovich, if you are of the opinion that manned missions should be flown by professionals, what do you think about journalists? This question has been raised more than once in the press.

[Shatalov] I have a great deal of respect for journalists. I have known for years journalists such as Yaroslav Golovanov and others who have raised this subject. I can therefore understand their desire to go into space and their frustrated disappointment over the fact that they have been unable to do so. On the other hand, however, I have never been in favor of news-grabbing "first" or "longest." I have always been interested first and foremost in end results: why are we flying a mission, what do we plan to do, and who is essential in order to accomplish these tasks? I shall state frankly that in the past as well I was not in favor of every single mission. Some missions, even international ones, fail to enhance the prestige of the space program if they are insufficiently promising from the standpoint of future participation in such activities by specialist personnel from these countries. I am in favor of such missions as the Soviet-French or Soviet-Bulgarian ones. Many instruments, even following completion of these crews' missions, are continuing to operate aboard the Mir space station and are furthering the space program.

Since we have touched upon this subject, I should also like to state that we have been criticized, and I in particular, for the fact that we do not train cosmonauts, for example, of some given nationality or ethnic affiliation from the Caucasus, Central Asia, or the Baltic. I consider such an approach to be absolutely erroneous and the pressure that has been applied to me unwarranted. It merely feeds ethnic, sometimes unhealthy sentiments. If we start counting which ethnic group has had its first, second, or 10th member in space, it can soon reach absurd extremes.

Experience has shown that a person of any nationality or ethnic group does a good job if he is well trained. It was probably not mere happenstance that one of the first to go up was a Chuvash. And a cosmonaut of a Caucasus ethnic affiliation recently returned from a year-long stay in space. Were these people sent up for ethnic considerations? Of course not. These people were in love with technology, and they worked hard to make their dream come true.

I feel the same way about professions. If we start counting who was first and who was second, an unhealthy publicity campaign is inevitable. For this reason I am against such appellations as "first scientist" and "first journalist."

Incidentally, cosmonaut Sevastyanov has press credentials. He does considerably more work than some professional journalists. We can state with full justification that there has already been a Soviet journalist in space. If somebody else wants to go up, then we must consider what benefit he can provide other than two or three additional articles. But it would be quite a luxury indeed to allocate and specifically spend millions on training him.

[AVIATSIYA I KOSMONAVTIKA] Many cosmonauts have written books, but they do not consider themselves

to be writers. Why is it that some writers and journalists have suddenly become space-program economists and are offering recommendations on curtailment of one program or another? And the Buran [Soviet space shuttle] is targeted more than others. What is your opinion, as director of the Cosmonaut Training Center?

[Shatalov] I myself would like to visit Mars as a cosmonaut, to pick up the first Mars rock and bring back to earth the one I choose rather than one which an automatic device may bring. Imagine what an automatic device might take home from Earth: a piece of asphalt, dust, dirt, or whatever, but not what a human cosmonaut would choose. In view of the state of the economy and environment, however, evidently such a mission should be postponed to a later date.

As for the orbital manned space program, it is operating directly for the benefit of earthlings and is the most important area, which should be developed and utilized to maximum benefit.

Much has been accomplished. Orbital space stations have been established, as well as means of transportation to and from these space stations. Docking systems, space station replenishment systems, and systems for returning payload to earth have been developed. During these years we have learned to perform any and all work tasks both inside and outside a station.

We have now produced commercial specimens of crystals and have set up the manufacture of medicines. Can one propose freezing this program for five years or so? That would be outright criminal.

In five years U.S. and European space stations for the manufacture of such items will have been built. Are we going to purchase these products abroad? The Americans and Europeans have grasped the importance of this technology and are already using our resources to prepare for manufacture. They are willing to spend 12 million dollars just to have us deliver 100 kilograms of payload to our orbital space station and back.

The U.S. Congress and European companies have approved a plan to build a space station which will be from three to four times larger than ours. This indicates that they understand the importance of setting up commercial manufacturing in orbit. They will have to solve many technical problems which we have already solved.

As for Buran, this is a new means of placing payloads into orbit and returning them to earth. It is distinguished not only by size but by capabilities as well. Just consider the U.S. experience: they repaired a satellite in orbit, saving 150,000,000 dollars, and they brought two satellites back to earth and subsequently put them back into orbit. This also represents hundreds of millions of dollars saved. Therefore such a technical asset is necessary. It is another matter to be always in such a hurry, as is the fact that some people want to copy the Americans.

We have heard these criticisms before. We replied that we are working on development of Buran, but we are proceeding along our own path. Even the Americans now realize this fact. In addition, they are working on improving their space shuttle according to our principle. Unfortunately not everybody in this country yet realizes this fact.

We are not hurrying our forward movement. No criticism should affect final development of Buran. Everything in its time. We also have a different approach to operation of the Energiya [space shuttle launch vehicle] system. The Americans, moving entirely away from expendable boosters, have concentrated their attention on the space shuttle. But remember what happened following the first disaster? For a long time the United States put nothing into orbit, and not because they had no wish to do so. They had no means at their disposal. This situation required additional tens upon tens of millions of dollars. We have never set such goals for our system and we consider our system unique as regards putting payloads into orbit. Intensity of launch scheduling will be determined by mission requirements. If a larger space station is to be built, for example, as the Americans are planning, we will need to make considerably fewer orbital flights. As for putting a halt to this program, the consequences will be entirely predictable. It is a simple matter to terminate production, cooperative effort, or a space launch facility. But who is going to restore everything at a later date?

Many people interpret lack of information as some kind of secret or to mean that we are unprepared for further activities. I believe that the criticisms will get us to do more about informing the public. When we state in advance what we are working on and what awaits us in the future, there will be fewer questions. In my opinion the main thing is that questions in this area be stated by competent individuals, be discussed in a businesslike atmosphere, and pursue the goal of seeking better utilization of scientific and technological advances in the interests of our country's economy and the future development of every branch and sector.

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Round-Table Discussion of AF Magazine's Strengths, Weaknesses

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[Round-table discussion, published under the heading "Reader-Magazine-Reader," by Hero of the Soviet Union Mark Lazarevich Gallay, Aleksey Ivanovich Gorokhov, and Honored Physician RSFSR Candidate of Medical Sciences Maj Gen Med Serv Stanislav Alekseyevich Bugrov: "Keeping Pace With the Times"]

[Text] A round-table discussion was held at the offices of the magazine AVIATSIYA I KOSMONAVTIKA. Participants included former test pilot and writer Hero of the

Soviet Union Mark Lazarevich Gallay, author of many works about aviators; Aleksey Ivanovich Gorokhov, who for eight years has headed the military department of the newspaper PRAVDA; and Candidate of Medical Sciences Maj Gen Med Serv Stanislav Alekseyevich Bugrov. A lively, informal exchange of opinions was held, dealing with perestroika in our country and in the Armed Forces, the role of the mass media in the further advance of perestroika, on the magazine's most notable articles, and on ways to increase the effectiveness of the printed word.

"I have subscribed to your magazine for many years," said M. Gallay. "I have been reading your articles with great interest for years. For the most part I have been pleased with them. But not all of them. In my opinion the first few pages of each issue are somewhat loaded down with long articles on general topics. They frequently follow a standard format. These articles should be somewhat shorter, but they should contain more information. The main thing is that they should address topics of vital interest, of which there are a great many in the military. When I get together with military pilots, we exchange views on various issues. There are so many different problems! The editors would do well to get closer to these problems and find room to discuss the most important of them."

"Up-to-date relevance, as well as innovation, are essential in our journalistic activities," A. Gorokhov continued his line of thought. "Although a magazine cannot be compared to a newspaper as regards speed of response, the magazine should not be so slow about addressing important events for the country and its Armed Forces."

"My interests as a reader," he went on, "have long been linked to the magazine AVIATSIYA I KOSMONAVTIKA. I was reading it when by father, an Air Force division senior engineer, was receiving it before the war. I myself have been subscribing for several decades now, and I keep back issues. Many of the articles are certainly worth reading. For example, the selection of materials prepared by one of your field teams on mastering a long-range bomber, containing commentary by Lt Gen Avn P. Deynekin (AVIATSIYA I KOSMONAVTIKA, No 7, 1988). Against the background of a discussion of our latest hardware and practical experience in its operation and maintenance, the authors convincingly demonstrate a unique aggregate of unresolved conflicts and contradictions between industry and the people who fly these aircraft."

"As we know, a large number of young officers have joined the units and subunits in recent years. But many of them do not know, for example, about the airfield they fly out of, the notable events of its history during the war years, as well as their unit's traditions and who established them. They do not know enough about the history of Soviet aviation, about leading aircraft designers and their amazing careers. There are many blank spots in

presenting the innovative achievements of those who have developed and are developing rocket boosters and other space hardware. I believe that the readers are entitled to expect articles on these and similar topics."

"I must state frankly that the lead articles, although written by qualified authors, do not always make interesting reading," Maj Gen Med Serv S. Bugrov stated his opinion. "They are too 'correct' and fail to stimulate the reader's thinking and feelings. It is apparent that they should more keenly address problems of perestroika and improvement in work style, methods of training and indoctrinating Air Force personnel, and they should more clearly present ways to increase the vigilance and combat readiness of Air Force units in conditions of reduction of military forces and implementation of our defense doctrine."

Stanislav Alekseyevich shared his impressions from his most recent visit to line units. He and a team of officers visited the Carpathian Military District in response to a letter sent by the women of a certain Air Force base to the Presidium of the USSR Supreme Soviet. There are hundreds of children of military personnel at the base, but they still do not have a kindergarten. Servicemen's families experience considerable inconveniences. The wives cannot take employment, since they are "tied down" at home. And this reflects on the mood, attitude, and job performance of aircrews and technical personnel. This situation has persisted for years, but it has not yet aroused genuine concern on the part of the command element or political workers. There are many such situations in line units. The magazine should not ignore them: it should respond strongly to vitally important needs of Air Force personnel.

"The magazine should provide more factual presentation of issues pertaining to psychological aptitude screening of young men sent to flight schools," said S. Bugrov. "It is no secret that the work and stress loads on flight personnel have increased appreciably with delivery of third-generation and fourth-generation aircraft to Air Force units, and yet pilot selection is still being conducted in the old way, sometimes without consideration of the human operator factor. At Air Force schools they 'grade' secondary-school graduates into a group 1, group 2 and group 3. The assumption is that group 1 is the most promising. And yet in actual fact things prove to be otherwise. When action is required, a person from this group does not act—he thinks things over. And he does this when time is of the essence! In short, practical experience is also making adjustments to problems of psychological aptitude screening. Further study by scientists and medical people is required here."

The participants in the round-table discussion exchanged views on the psychology of today's reader, on his needs and interests. A. Gorokhov directed attention to the fact that young people apparently make up the bulk of the readership. The magazine should more fully consider these readers' concerns, interests, level of knowledge, and general educational level. "I am sure

that many readers do not really know much about such latest-generation aircraft as, for example, the MiG-29, MiG-31, Su-25, and Su-27. The magazine should devote discussion to these aircraft."

M. Gallay, further elaborating on this subject, emphasized that it is important not merely to give the reader an idea about our modern combat hardware but also to show it in comparison with the potential adversary's counterpart aircraft, in order more graphically to show their strong and weak points. Nevertheless principal attention should unquestionably be focused on the person who is working to master this equipment, on his ideological and moral staunchness, his psychological conditioning, his ability to make unconventional decisions in an emergency situation.

"We are standing, so to speak, at the threshold of a new round in study of the psychology of today's pilot, and it is important to take this into consideration when preparing articles," he summed up his point.

S. Bugrov shared his concern in connection with the fact that many obsolete documents, which frequently duplicate one another or, what is even worse, contradict or are in conflict with one another, continue to remain in effect. It sometimes happens that in a difficult situation an air traffic controller is not always able to determine immediately how he should proceed. Here too there is need for reexamination of treatment and interpretation of points and provisions which would seem to be long since clear. Making reference to an article by Commander in Chief of the Air Force Mar Avn A. Yefimov entitled "The Right To Make a Mistake" (AVIATSIYA I KOSMONAVTIKA, No 12, 1988), S. Bugrov noted that he had taken part in a spontaneous debate about the problems raised in this article.

"We argued until we were hoarse, but I assure you that every single one of us benefited greatly from this discussion," he concluded with firmness of conviction.

The participants in the round-table discussion talked about a broad range of issues, including the forms in which materials should be presented. They also discussed the magazine's "countenance," the features of its graphics presentation, and the diversity of author styles. In short, the discussion was detailed, specific, beneficial, and focused on assimilating the advanced know-how of

the mass media as well as on increasing the effectiveness of articles. In conclusion, magazine chief editor Col O. Nazarov expressed confidence that all the valuable and instructive comments made by the participants in the round-table discussion would find practical embodiment in the work of the magazine's staff.

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Articles Not Translated From AVIATSIYA I KOSMONAVTIKA No 8, August 1989

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